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JUDGE FOOTE, of the California Supreme Court, has just rendered a decision in a suit brought to decide the liability for damage done to adjacent property by careless blasting, and not only the conclusion he reaches seems to us the proper one, but the principle he lays down seems to cover damage of any kind done to a neighboring property through improperly executed building operations of any kind, whether by blasting, undermining of party-walls, defective shoring, or whatever else. As the case, Colton *vs.* Onderdonk, was carried up from the court below, where the plaintiff got a verdict which was only slightly cut down in the Supreme Court, it is a good one to remember. In giving his opinion, Judge Foote said that the fact that the defendant had used gunpowder in blasting in a lot adjoining other buildings not belonging to him must be taken as showing that the defendant had made an "unreasonable and unnatural use of his own property, which no care or skill in so doing can excuse him from being responsible to the plaintiff for the damage he actually did to his dwelling-house as the natural and proximate result of his blasting." This does not at all mean that it is unlawful or improper to fire blasts where there is a possibility of working injury to adjoining property: it only emphasizes the fact that there are certain acts, proper and lawful enough in themselves, which are, nevertheless, inalienably connected with more or less definite risks, and that the person who performs these acts cannot be absolved by having obtained legal license, for instance, so to do from a full responsibility to the injured party for any damage he may suffer through such acts. Judge Foote goes even farther than this, and holds that "an act which in many cases is in itself lawful becomes unlawful when by it damage has accrued to the property of another." It may seem a little peculiar that a lawful act can ever become unlawful, but as any one in five minutes can think of a dozen lawful acts which are punishable at law, if they have been so unlucky as to cause damage to any one, we have no reason to doubt that the learned justice is absolutely in the right; at any rate, what he says is sensible, and, as we said, covers damages inflicted by more things than gunpowder.

THE Springfield *Republican* tells an almost unbelievable story about the great Navarro flats — the "Lisbon," the "Madrid," the "Cordova," and the "Barcelona" — in New York, which are familiar sights to all visitors to the city; unbelievable because, though one man might be careless enough to invest money in real estate without thoroughly searching the title or putting his deeds on record, it is almost incredible that half-a-dozen men accustomed to business transactions should have acted so recklessly. The tale is that Mr. Navarro, when entering on so large an undertaking, naturally had recourse to the familiar means of raising money by mortgaging the property, and obtained a million dollars in this way from the Mutual Life Insurance Company, on four first mortgages. As the buildings progressed, Mr. Navarro had need of more money, and then conceived his coöperative plan, the details of which we have given in these pages, and in return for large sums of money varying from twenty to fifty thousand dollars leased certain unfinished apartments to the gentlemen who wished to take part in his venture, allowing them to finish the apartments to suit their several fancies, and giving them ninety-nine-year leases. A clause in these leases expressly states that they are subject to existing mortgages, so that the lessees were evidently put on inquiry, and if they failed to search the titles after such a warning, or put their leases and contracts on record, they cannot complain that the present crisis could not have been foreseen. It now appears that Mr. Navarro has not properly liquidated the interest on his mortgages or paid his taxes, and the insurance company, tired of this neglect, now proposes to foreclose. It also appears that other parties interested in the property were not so oblivious of legal forms as the unfortunate lessees, for no sooner did the insurance company announce its decision than a Mr. McComb, of Dobbs Ferry, comes forward and shows that he holds recorded second and third mortgages on the property, to the amount of two million dollars. The plight of the lessees is exceedingly uncomfortable, for it is probable that the annual rental of the apartments is a nominal sum in consideration of the sum invested in the actual construction of the building, and it is hardly supposable that after foreclosure the mortgagees will be willing to renew the leases on such favorable terms, as these rents would probably not represent a fair interest on their investment. The moral is obvious.

THE enthusiasm with which committees and individuals engage in getting up exhibitions of architectural drawings is pretty sure to meet with a very shabby recompense, so far as their reward is dependent on attracting the attention of the public in its sight-seeing mood. The desolation which seems to pervade the room or section assigned to the display of architectural drawings is such that even members of the profession must feel as if they were committing sacrilege by breaking the quiet that rules over these neglected spots. People will travel miles and cross oceans to enjoy the beauties of some noted building, while they will not cross the room to look at a black-and-white drawing of it; and it is not strange that they feel so, for even architects are affected by the same feeling in a less degree. Perhaps one reason for this, so far at least as the public is concerned, is that there is missed in an exhibition of drawings all sense of scale, and hence it is impossible to get from representations on drawing-paper even the merest ghost of that awe-inspiring sensation which would steal over even uneducated minds when brought face to face with the mere bulk and enclosed space of some buildings, which if represented in an exhibition of architectural drawings would be considered as of no more significance—probably less—than the shingle palace shown in the drawing hung by its side. A stereopticon exhibition of architectural views is usually a success, for in them the sense of scale is better preserved, and can be understood by all, as witness the surprised murmur that breaks from an audience when a new slide showing some architectural monument of merit is introduced into the lantern. We suggest to the committee who have charge of the architectural exhibit for the Minneapolis Exposition, and who between now and August 15 will seek for contributions of drawings, to seek rather for photographs of executed works. If from these they will have made stereopticon slides, and install that useful instrument in a dark room in the exhibition building, we think they may feel sure that the architectural exhibit will be one of the most popular features of the exhibition: the success would be even more certain if, such is the frailty of human nature, a small entrance-fee should be charged, which would cancel or at least diminish the cost of preparing the transparencies and hiring the magic-lantern. As it might be monotonous for any one to exhibit

architectural views all day long for weeks together, it would be well to discover if an automatic attachment could not be devised for the occasion.

THE exhibition we speak of above is largely due to the efforts of the *Northwestern Architect*, and this, and the fact that the conductors of another journal, the *American Builder*, are engaged in getting together an exhibition of a little different kind, seem to show that the professional journals are part and parcel of the profession and vital forces in promoting its interests wherever occasion seems to offer. The *American Builder* is interested in creating a permanent exhibition of building materials at Cleveland, after the manner of the one in Chicago, and its imitator at St. Paul. The Cleveland enterprise is none the less legitimate, because it is probably more a money-making than a philanthropic venture, but while its novelty is still unfaded it will be of some real service to those who are engaged in building, whether architects, builders or owners. It will take much ingenuity on the part of the managers to keep it from becoming, in course of time, merely a dust-colored and much-neglected collection of commodities, which have in their detached and unapplied forms almost no attraction for the general public.

IF there is really to be an American exhibition in London next year, of which we confess we are somewhat doubtful, we hope that it will be a success. It is about two years since this exhibition was announced, and during that time manufacturers and newspapers in this country have received from the projectors many and various printed documents, which consisted mainly of lists of officials — largely honorary non-workers who happened to have titles to commend them — the names of a few American manufacturers who had promised to send exhibits, sketches of the careers of the active promoters of the undertaking, illustrated sometimes by their portraits, and more or less mythical statements as to the ground secured for the exhibition and the plans of the buildings in which it was to be held. We call them "mythical," for about a year ago inquiries were made of their English correspondents, by certain Americans who thought of preparing goods for show, which elicited the statements that no one in London knew anything of the affair, and that the site said to be secured for the exhibition had not been leased for any such purpose. Furthermore, when some months ago it was rumored that President Cleveland had accepted the presidency of the stock company which is supposed to have the matter in charge, one of the leading New York papers published a long letter of remonstrance from a correspondent, who said Mr. Cleveland could not have known what kind of men he was consenting to associate with, and then proceeded to give the history of some of the promoters. Since that time we have seen it stated that Mr. Washburn was to be the president, and now we see that Mr. Goshorn, the chief director of the Centennial Exhibition is to act in that capacity. The latest "address" issued by the directors states that the exhibition is to be opened May 2, 1887, and urges American manufacturers to bestir themselves. We will not go so far as to say that the exhibition will not take place, but we do advise intending exhibitors to make careful inquiries of disinterested correspondents in England before they assume the risk of preparing and despatching their exhibits; for even if everything is all right it is to be remembered that this "Yankeries," as we have seen it styled, is a purely private undertaking, without government support or recognition, and exhibitors must count on having to bear the cost of sending their goods to London unaided, and in like manner getting them back again. The idea of such an exhibition is in many ways good, and it might — and may — turn out both interesting and successful, and if it should prove to be so we will both rejoice and confess that our present foreboding that the matter is not in the hands of the right kind of men was foundationless.

THE matter of underground electric wires seems just now to excite more interest than any other. Cincinnati is considering the question, and has a committee which is examining the merits of the different systems. In that city an unusual obstacle will have to be overcome: during the present season the city is spending several million dollars in repaving the streets with granite blocks, and not only are the authorities a little unwilling to have their work undone so soon and the fair level of the roadway injured, but the citizens may reasonably feel that they have been subjected to enough annoyance for one year through the interruption of traffic. It seems as if the proper thing would be to suspend at once all further paving work until an underground electric system had been selected, so that both operations could be carried on at once in the streets which are yet to be repaved. In the matter of the New York electric subways there seems a promise of lively times if half that the newspapers report is true. The New York *Times* is particularly active in trying to find out the inner meaning of the peculiar letting of the contract, and thinks it has discovered first that the Consolidated Telegraph and Electric Subway Company was at the time the contract was awarded practically an organization as yet unborn: next that a man named Flynn, a son-in-law of one of the Subway Commissioners, was likely to be a large gainer as a reward for his occult engineering of the contract into the hands of his associate; next that the Bell Telephone Company is likely to appear in the consolidation as the provider of the capital, and that hence rival monopolies, large or small, may expect small favor at its hands, and, lastly, that the Western Union will probably resist the mandate of the Subway Commission on the ground that the act under which they receive their power is unconstitutional; and that, furthermore, the Western Union had the prevision to spend forty thousand dollars at the time the act was in preparation for the sake of having the act so mis-drawn that it should be unconstitutional. That the Western Union and other corporations, which have fairly vested rights in poles and other apparatus, which they maintain are taxed as real estate, will resist as long as possible can easily be believed, but it is impossible not to feel assured that in the end all wires will be put under ground, whether in accordance with the present act, or some other one drawn with all necessary care.

CONJECTURE, inference and imagination play such important rôles in the discoveries made by learned archæologists that it is easy to see why there are so many differences of opinion arising between the doctors of the dusty craft, and such hot discussions brought under the eyes of the public, who cannot help wondering why such intemperate language should be used in arguing over such ridiculously unimportant matters. The course of archæological investigation is usually this: an investigator makes certain discoveries, records his facts and formulates his theories; immediately after he leaves the field other archæologists visit the new "finds" and prove to their own satisfaction that the theories of the original discoverer are all wrong, and that the facts, if correctly stated at first, really support vastly different hypotheses. The only way of obviating these unpleasant disputes seems to be for archæologists to hunt in couples or companies, and settle their disputes on the spot. A case in point is that of the Royal Tombs at Mycenæ, which Dr. Schliemann, the original discoverer, believed to be the sepulchres of the Achæan Princes before the time of Agamemnon, but which Mr. Stillman, who visited them later, feels convinced are merely Celtic graves, of the third century before Christ, basing his argument on the character of the masonry. A later visitor, Professor W. W. Goodwin, of Harvard College, feels assured however, that the true date of the masonry is A. D. 1879; for he discovered that directly after Dr. Schliemann had left Mycenæ, and before Mr. Stillman visited it, the Greek laborers who had been employed in the excavations *had taken down every stone* used in the tombs in the search for treasures that had escaped the anxious eye of Dr. Schliemann, and that they had afterwards attempted to rebuild them as they were originally. It is not surprising that the character given by them to the masonry deceived Mr. Stillman, but it does seem strange that he should have overlooked the presence of freshly-split stones in the wall which Professor Goodwin, who does not profess to be anything more than a student of Greek literature, at once discovered. So there seems to be no reason for discrediting the description and the measured drawings of Dr. Schliemann. This incident seems to show that succeeding observers of an archæological discovery may be easily misled. and that if the original discoverer wishes to have his descriptions uncontradicted he must support them by the evidence which can only be furnished by the camera, a measuring-rod being introduced in each view.

AN EDITOR'S TRIP ABROAD.[1] — VI.

PISE WORK ABOUT LYONS. — SEMI-TROPICAL VERDURE ABOUT MARSEILLES. — NORTHERN ITALY.

ENGRAVED GEM.
FROM THE "ART DECORATIF."

I DOUBT if any ride of similar length affords greater interest to the unambitious architectural mind than that from Paris to Genoa, through Lyons and Marseilles. By taking the "*rapide*" train, which leaves Paris at a comfortable hour in the morning, and stopping over for the night at Lyons, Marseilles and Nice, the whole journey can be made by daylight, and most of it in "*omnibus*" trains, which are as much superior to express trains for observing the country which they pass through as a stage-coach would be superior to them, if any such mode of transportation were available. It would be difficult to say too much of the picturesqueness of the farm-houses and villages of Picardy, which seemed to me to have a flavor much more quaint and delicate than those of Normandy; but in the journey from Paris to Italy, by the Mediterranean coast, the character of the humbler sort of architecture changes almost with every hour, according to the variations of the climate and the peculiarities of the local population. Starting from Paris, and passing through Melun and Fontainebleau, one sees a great deal of the prettiest suburban work to be found anywhere around the city, and as this gradually disappears, its place is taken by the beautifully stylish and artistic domestic building to which the good materials supplied by the Burgundian hills seem to have given a motive, varied by glimpses of more important architecture at Sens, Joigny, Tonnerre, Dijon and a dozen other places. As the train approaches Lyons, the eye of the practical man is struck by the occasional appearance of roofs covered with curved tiles, after the Italian fashion, instead of the plain flat ones, or those with a sort of standing-seam joint, which had previously been the only sort used. The curved tiles, although they are cheap and shed rain well enough, leave so many openings for wind and snow that I was surprised to see them used in a climate so far from mild as that of the region about Lyons, but it appeared on further examination that those on dwelling-houses were pointed up tight with mortar. The washings from the mortar gave these roofs a streaky, stony look that pleased me very much, and some of them were even purposely whitewashed all over, giving the house to which they belonged the appearance of a limestone boulder.

About Lyons itself there is not much good building stone, and walls of *pisé*, or tempered loam, began to occur not far from Macon. The first examples were mostly garden enclosures, but houses, two three, and even four stories high, built of the same material, soon appeared. It was easy to distinguish them by the alternating oblique lines of the joints caused by the shifting of the boxes or frames in which the *pisé* is made, as well as by the traces of the pointing employed to fill up the holes left by the cross-sticks, which hold the frames and are pulled out of the wall when these are shifted. In most cases the wall was left of the natural color of the yellowish loam, varied by the lighter streaks of the mud joints, but some of the houses were whitewashed over all. No precautions against dampness or rain seemed to be taken, except to begin the walls on a course of pebbles, to keep them a little off the ground, and to protect the top by projecting eaves of some kind, the garden walls having little tile roofs over their whole length. In some new houses the floor beams appeared to be built in after the manner usual with masonry, but there were probably flat stones or timbers under the ends, to distribute the weight. The thickness of the walls did not seem to be greater than that which we should give to a wall of rubble-stone under similar circumstances, but I did not see a single example which looked cracked or badly decayed. It has often been suggested that this sort of construction would be well adapted for our own Mississippi Valley, where loam is abundant, and stone and wood and skilled labor scarce, and there seems to be no reason why it should not answer as well for Iowa and Mississippi as for the district about Lyons.

On leaving Lyons for Marseilles, the symptoms of a change in climate begin to multiply rapidly. One of the most marked of these is the lowering of the pitch of the roofs, which take on an Italian aspect very different from that of the Northern buildings. Stone soon begins to be used again, but more and more after the Italian fashion of plastered rubble, walls of cut-stone appearing only in the handsomer houses, and in the churches and the old castles, which are here so numerous that one or two, at least, are almost always in sight from the train. Most of the castles seemed to me to be different in style from those which we had seen north of Lyons. There were fewer round towers, and the buildings were not only better preserved, but usually much more extensive than the others. At Montélimar, Orange and Avignon, particularly, were vast and picturesque ruins, while at Tarascon were two huge castles, threatening each other from opposite sides of the river. At Orange and Arles the first Roman remains came into view, in the shape of rows of great semi-circular brick arches, standing apparently at random in the modern streets; and at about the same point occasional small olive-trees, with gray, willow-like foliage, began to vary the monotony of the endless vineyards, which occupy the ground, almost to the exclusion of everything else, for five hundred miles, from the neighborhood of Paris to the point where all vegetation disappears in the stony plain which forms the approach to Marseilles.

Gateway at Bordeaux, France.

At Marseilles, although the city itself presented nothing more than streets of rather handsome houses of plastered rubble, the parks and squares had a sort of semi-tropical look, to which we were quite unaccustomed. It is quite likely that there, as in Richmond and Washington, some effort is made, for the sake of novelty, to cultivate trees which endure the climate only with difficulty, and some of the palm-trees in the gardens looked as if they had led a hard life, but, although stunted and brown, they were real palm-trees, and mingled among them were hundreds of oleander-trees, fifteen to twenty feet high, covered with pink and red and white flowers, with here and there a great magnolia in full bloom. The next morning, however, as we moved eastward from Marseilles into the shelter of the mountains which protect the Riviera from the north wind, the aspect of the country changed rapidly, and at Fréjus, not many miles from Marseilles, we saw for the first time a natural and unprotected date-palm tree, some sixty feet high, standing in the back-yard of a cottage near the station. This was the precursor of thousands more, and from Fréjus to Nice the hillside villages along the coast were literally buried in palms and oleanders, orange and lemon trees, grape-vines,

[1] Continued from page 41, No. 552.

olive-trees and flowers. Of the latter, the various sorts of geranium were most conspicuous. The double scarlet and pink geraniums seemed to be mere weeds, masses of them, in full flower, growing on the railroad embankments, hanging over the retaining-walls of the terraced orchards and vineyards, or growing out of the "weep-holes" in the masonry, and a climber with large pink flowers, and another with a profusion of blue flowers, covered a considerable part of the spaces which the geraniums left vacant, while here and there a little variety was given by masses of scarlet trumpet-flowers, or by blue passion-flowers, with which one little station was nearly covered. The oranges were in some places nearly ripe, and showed, as did some that we bought at Lyons, a reddish blush, like that of an apple, on the sunny side.

As might be expected, the change in climate from France to Italy was accompanied with a decided change in the character of the buildings along the shore. Here and there some new city of villas and hotels, like Cannes, or Nice, or Mentone, would dazzle one's eyes with its pink and yellow and white stuccoed walls, but the older towns were masses of tall houses that had once been white, crowded along narrow streets, and pieced out and connected together with all those arches and flying buttresses and corbellings which so delight the architect's heart in Italy. After leaving Nice, near which the traveller on the railway gets a near view of Garnier's rather unsuccessful building for the Monte Carlo gambling-house, the little towns acquire, perhaps, a still stronger Italian flavor from the more frequent introduction of fresco decoration on the plastered exterior surface. The commonest subject is a Raphaelesque Madonna, or saint of some kind, generally accompanied by other figures and enclosed in a blue border, painted near the front door, apparently as a sort of dedication of the house to Christian domesticity. There was not much originality about the pictures that we saw, a large part of them having very evidently appropriated their composition bodily from the Sistine Madonna; but some were executed with no mean skill, and it was rather pleasant to observe that they were usually placed under a balcony or shelter of some kind, and were carefully looked after, many having flowers hung up about them.

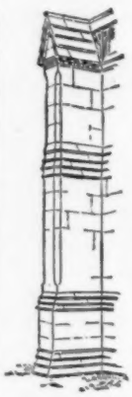
Naturally enough, a community so piously inclined is provided with plenty of churches, old and new. Of these the former interested me most, but there were some extremely pretty new ones, built in a rather lighter style than that of their predecessors, and proportioned and colored with admirable taste. One, in particular, of very simple construction, possessed a beautiful tower, square in plan for about sixty feet from the ground, and pierced only for the door and for four plain, round-arched windows, the heads of which were about forty-five feet from the ground. This portion was terminated by a projecting balcony, with stone corbelling and platform and iron railing, and above this was a square second story, having a large round-arched opening on each side, with moulded archivolt, and moulded impost extending around each pier; then came a moulded cornice of slight projection, and above all an octagonal story, with round-arched windows in the alternate sides, and small archivolt and impost mouldings and an octagonal semi-dome roof. The roof was apparently a real stone dome, but was covered with red tiles. The base of the dome, and all the horizontal mouldings and archivolts, and the corbelling under the balcony, were painted white, and the remaining surfaces green, of a light, chalky shade that suited the surroundings perfectly. Among the old buildings, one of the most curious and effective was at San Lorenzo, where there was a church of considerable size, with nave, aisles and transepts, situated near the west end of the church, an octagonal tower over the crossing, and a semicircular apse, with a tower, as seemed to be most common in this region, situated at the end of the north aisle, a little distance from the apse. The nave and aisles, as in all the other churches in the vicinity, were covered with a continuous roof of low pitch, and the same was carried over the transepts, the projection of which beyond the exterior aisle wall was semi-circular, giving a singular air to that end of the building, but helping greatly the effect of the low dome, which would have been completely extinguished by ordinary transept gables.

Fixtures and Personal Property.—An engine, boiler, and certain machinery were claimed as personal property by one party and as fixtures by another. A shed, opening only into the factory, had been built over the engine and boiler, and the latter rested on a brick ash-box, while the machinery was partly nailed and partly screwed to the floor. The master to whom the matter was referred found the articles to be personal property, not fixtures; and the case being carried up on appeal, this decision was sustained. Judge Holmes in his opinion said: "Perhaps it would have saved perplexing questions if the rule of the common law had been more strictly adhered to, that whatever is annexed to the freehold by the owner becomes a part of the realty and passes by a conveyance of it. The right of a tenant to sever chattels which he has attached to the realty might be admitted, and yet the property might be regarded as land until severed, as it seems to be in England. The decisions of this State [Massachusetts] establish that machinery may remain chattels for all purposes, even though physically attached to the freehold by the owner, if the mode of attachment indicates that it is merely to steady them for their more convenient use, and not to make them an adjunct of the building or soil. We see no ground to interfere with the finding of the master in this case. This property is not at all necessarily to be considered fixtures."—(*Carpenter vs. Walker; Supreme Judicial Court of Massachusetts.*)

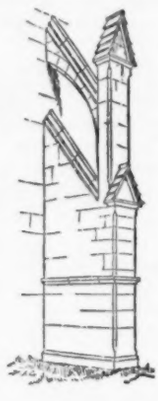
CONSTRUCTION THE ORIGIN OF ARCHITECTURAL DETAILS.[1]—II.

Warboys, Lincolnshire.

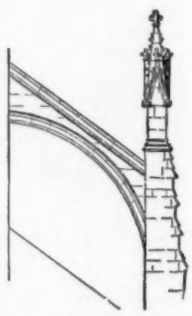
In connection with piers and buttresses there is another feature very pertinent to our subject. Here we have a mass of stone gradually diminishing, it is true, as it approaches the point where it connects with the springer of the vaults. Great strength is required certainly, but are we sure that we have not got more material than we need. There are stones upon stones which appear to have no other duty than to give a minute portion of their own strength to support other stones which actually do the work of resisting the thrusting vaults. Could we not arrange the really active stones in some such manner that they may support each other, and still give the requisite support to the roof, and do away with those stones which do little to contribute necessary strength, and beyond that only take up a great deal of space. This idea was put into practice, and with the greatest success. The upper part of the buttresses was constructed on the principle of a half arch, transmitting the thrust to the lower part, leaving a space beneath it, formerly occupied by a great bulk of masonry—that has now been found to be unnecessary—to be turned into an aisle or chapel, to be walled and roofed in as circumstances might suggest, and made a part of the interior of the edifice. Again, there is a further way of reducing the mass at the base of these new flying-buttresses: they can be cut down on the outside, as well as on the inside, but with this proviso, as in each other case, that if we remove the material from a vital part, we must put it somewhere else, or give an equivalent for it. The tendency of the flying-buttress is to spring or "kick out" at its foot, and to resist this, weight is required at the top of the buttress proper. If we take away the solid gable, we must introduce another feature, viz.:



Salisbury.



Hartlepool, Durham. A. D., 1250.



Flying-Buttress, Salisbury Cathedral.

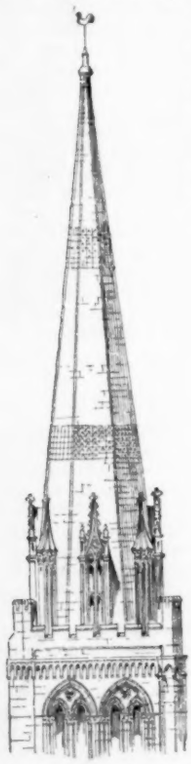
the "pinnacle," not as an ornament in the first place, but as a structural necessity. A very beautiful feature about the chancel of a cathedral is that arrangement of chapels known by the term "*chevet.*" Here is a semi-octagonal apse, from every angle of which on the inside springs a rib of the vaulting. On the outside are buttresses to receive and resist the thrust of these ribs, radiating on plan from the centre of the octagon, and as they recede from the chancel walls, of course the spaces between them widen. A happy thought occurred to some one about the end of the ninth century, and that was to enclose and roof over this space and thus form small chambers or chapels, one to each side of the semi-octagon. This is a well-known feature, affording an endless variety of combinations of curves of the arches, set off and enhanced by the upright lines of the piers, that rise above and are carried up to the springing of the vaults. Here we have such a play of light and shade that we doubt whether any other arrangement exists in the whole world of design that can surpass this for beauty and effect. The origin of this was a construction and arrangement of buttresses, which grew as a matter of necessity, and the architects did but take it as it was and made the best of it. The buttresses were not so arranged for the sake of putting chapels between them, but the chapels were the afterthought.

Auxerre.

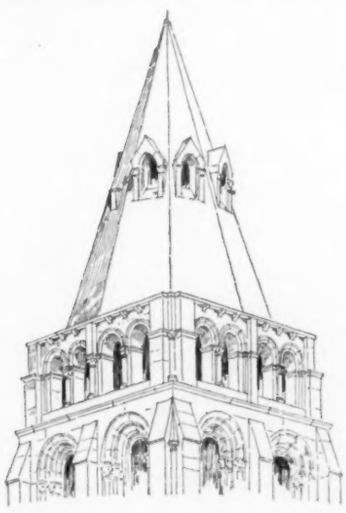
[1] By R. W. Gambier-Bousfield. Continued from No. 552, page 40.

We must call attention to another detail of very common occurrence, and this is in connection with towers and spires; viz., the method of changing from a square tower to an octagonal spire. To set such a spire on the top of a square tower abruptly is decidedly undignified and ungraceful in result, and seems to need some further detail, such as a parapet to hide the junction. This was constantly employed, and the plan of the spire was considerably smaller at the base than the square of the tower, so as to leave a passage between it and the parapet, but where the octagon is of the same diameter as the tower, a gradual change, as shown in the initial cut, seems to carry the eye from ground to summit without any abrupt interruption, and the two totally distinct forms are made one and indivisible. And this, again, is not a mere fancy of the designers, but a useful piece of construction. In the same connection is another and even more scientific detail, somewhat akin to the principle of the pinnacle. This is specially noticeable in the spire of Chichester Cathedral, although there are innumerable examples both in cathedral and parish churches. At the junction of towers and spires are very beautiful canopies supported by slender shafts, rising in some cases over twenty feet in height. The feet of these shafts rest on the outer lower edge of the spire, while the shafts themselves rise perpendicularly, and as the sides of the spire recede towards the apex, the space between the two gradually widens, until at the roof there is a space of several feet. Sometimes the space between the shafts is filled in with masonry and pierced with windows, to give light to the interior of the spire, but often it is left open, and appears to be nothing more nor less than a niche. This charming feature, graceful and beautiful in the extreme, instead of being a useless ornament, is a *structural necessity*. It is the main-stay and prop of the superstructure, and its weight is sufficient to counteract the outward thrust of the sloping sides of the spire. This is its office and function, and for this purpose was it introduced.

S. Petronio, Bologna. — Solid buttresses forming chapel walls.



Chichester Canopies and Pinnacles Threnf.



Cormery.

In many small country churches one often sees a bell-turret erected somewhere above the roof, where no spire or tower exists. But although this cannot claim a place as a structural necessity, yet it is a good example of the treatment of a requirement or practical need. It was necessary to have bells outside the church, where the building itself would not interfere with the spread of the waves of sound, and if placed high up in an exposed position, they must have strong supports; and while we are about it we may as well give them some protection from the inclemency of the weather. So we have here a detail which has many charms in itself, arising from a social requirement, not stuck up in so conspicuous a position because it happened to be a good place for a prominent feature, but because no other place would be so suitable for the attainment of the object in view. And we see that this is not a piece of constructed ornament, but ornamented and ornamental construction. Not only in large details is the truth of the art demonstrated, but, look where we will, we may find examples in the simplest forms. Take, for instance, any cap or base: there is the bell-line in each, into which no hollows must be cut, not merely because it gives an appearance of weakness, which is unsatisfactory, but because it is actually a weakening of the bearing powers of the cap or base. When a superincumbent weight is to be supported by some figure of much less area than itself, the diminution from the one to the other must be gradual, more or less so, according to the material used; if otherwise, we should have an actual fault in construction, seriously endangering the stability of the part to be supported. So the form of our caps has some other consideration in it than mere constructed ornament. An ornamental piece of construction is a boss, placed at the intersection of the ribs of a vaulted ceiling. Sometimes these ribs come together from different angles, and their junction in such cases is not pleasing. That they must meet, and meet pretty much where and as they like, goes without saying, as our arches in vaulting must be complete, and, to say the least of it, the introduction of a boss here decidedly improves the appearance, and the junction or intersection of the ribs is thus emphasized. The labels or drip-moulds over the heads of windows have their origin in necessity. It was required to keep from the window the flow of water, caused by the rain down the walls, and the simplest way to do this was to put some projection above, that would stop the water and make it drip off without touching the window itself. These labels are treated with all kinds of elaboration, but they remain drips throughout, and they take their place as an example of ornamented construction.

Glastonbury.

Before concluding, we would remark that there is no greater fallacy in design than the idea that an ornament may be clapped on, to cover some ugly piece of construction. To do this is to make your ornament a lie and a veil for deceit. If you have some plain surface, that if ornamented would improve the appearance of the whole building, by all means put some suitable ornament there, but let it be seen that it is an ornament, pure and simple, but don't try to work things about it, so that it may appear to be a necessity of construction. Let your building be truth in itself in every particular, and your ornament that kind of decoration which only enhances and emphasizes the truth, and you will be proving over and over again the divine origin of your art, and in every detail you will stand as a champion for her defense against the vandalism and extravagance of that common fiend "Sham."

"Oh, gather whereso'er ye safely may,
The help which slackening piety requires,
Nor deem that he, perforce, must go astray
Who treads upon the footmarks of his sires."
—*Wordsworth.*

TRIPS ABOUT MODERN ATHENS.

TRAVELLERS who stayed at Athens for a few days a couple of years ago could see comparatively little. They were obliged to content themselves with visiting the remains of antiquity in the city, and had barely time left to inspect some of those in the immediate neighborhood. The limitation of days and hours on which the ruins were open to inspection — the Acropolis and the museum of the Acropolis not excepted — was made more troublesome by the scattering of the museums, which were only shown on certain days of the week; and even in the city the visitor had to waste a good deal of time to no purpose. Of excursions into the neighborhood to Marathon, Pentelicus, Eleusis, Sunium, Ægina, the traveller who was pressed for time could attempt few, and, of course, he could not indulge in expeditions to Corinth, Nemea, Tiryns, or Mycenæ; they involved a rather lengthy journey or a fatiguing ride. It deserves to be mentioned that now, through the

improvement of the organization of the museums and the improvement in the means of communication, a visit to Athens has become much better worth paying since, even if the tourist's sojourn be limited, he can make excursions as far as Mycenæ and Tiryns at a cheap rate. A visit to Eleusis no longer requires a whole day and a carriage drive of eight long hours there and back. The railway from Athens to Patras, which will soon be open to Ægium, and is already in working order as far as Sicyon, conveys the traveller to Eleusis in an hour. The visit to the sanctuary of Ceres and the recent excavations occupies a forenoon agreeably, and the railway journey only costs half a crown. In an hour after passing Eleusis the train reaches Megara, and in an hour and a half more Corinth, after passing the interesting precipices of the Scironian Rocks. At an hour's distance from Corinth the line reaches the beautiful and vine-clad Kiato, whence an easy ride of some three-quarters of an hour brings the traveller to the ruins of the ancient Sicyon, at the modern village of Wassiliko. By another branch of the same railway the tourist gets from Corinth to Nauplia in three hours. By this branch four sites of great historical interest are brought within a manageable distance of Athens — I mean Nemea, Mycenæ, Argos, and Tiryns. In the so-called little tour of the Peloponnesus one used to spend at least four days in visiting these localities, now they can be much more conveniently seen in less than two days. The journey from Athens to Mycenæ takes six hours. One can leave Athens quite early in the morning, breakfast at Corinth, and in two more hours reach the station of Phichtia. From this village it is a ride of three-quarters of an hour to the Treasury and the Acropolis of the Atreidæ. The station Nemea is on the line from Corinth to Phichtia, and is only twenty minutes distant from the latter place. Argos is only five-and-twenty minutes from Nemea. Tiryns is reached in a train in twenty minutes from Argos, but in ten from Nauplia. All these places, therefore, are not only brought nearer to Athens, but close to one another. The sights of the ancient civilization of Argolis are, through the revolution in modern communications, more quickly compared, and, so to say, more correctly comprehended. As the railway to Nauplia has only been in operation for a month, it is obvious that all the requirements of the tourists are not yet provided for at the station of Phichtia. No horses are to be found there in readiness for the ride to Mycenæ. A carriage-road is already talked of on all hands, and, as it could be easily made, it will, it is hoped, be ready before long. From the opening of a carriage-road to the starting of a hotel in the neighborhood of the ruins of Mycenæ is only a step. One has already been begun at Nemea. At Tiryns, owing to its nearness to Nauplia, there is no need of one.

On the other side, the railway from Athens to Laurium makes the district accessible to archæologists. In half an hour Cephissia is reached, and this favorite place of Herodes Atticus and Aulus, which contains the supposed sarcophagus of the former can be easily visited. In less than three hours the country between Athens and Laurium is traversed, which is interesting for its historical associations and for its mines. When on this excursion the stranger can conveniently visit the ruins of the ancient Thoricus, but the most attractive expedition is that to the Temple of Athene at Sunium, which can now be reached in two hours and a half. So the traveller who is in a hurry may leave Athens late in the afternoon, reach Laurium in the evening, see the miners at work under the electric light, on the following morning go to Sunium, lunch there, visit Thoricus, and return to Athens by eight o'clock in the evening.

The delightful excursion to the summit of Pentelicus, which most tourists make in order to view from there the plain of Marathon and the Athenian plain at sunrise, has been much facilitated by the Cephissia railway. It is now possible to spend the night comfortably at Cephissia and thence start on horseback some two hours before sunrise. Finally the tramways offer easy access to the immediate environs of Athens. The Hill of Colonus and the tombs of Lenormant and Carl Ottfried Müller may be reached in ten minutes ride from the city by taking the tramway from the Place de Concorde to Colocynthia.—*Athenæum.*

ILLUSTRATIONS

Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSES OF MRS. W. H. VANDERBILT AND MRS. E. F. SHEPARD, FIFTH AVE., NEW YORK. MESSRS. ATWOOD, SNOOK AND HERTER BROS., ARCHITECTS, NEW YORK, N. Y.

[Gelatine print issued only with the Imperial and Gelatine editions.]

THE CASTELLO SAN ANGELO, ROME, ITALY. AFTER AN ETCHING BY M. LUCIEN GAUTIER.

UNTIL the seige of Rome by the Goths, A. D. 537, what is now known as the Castello San Angelo had been the tomb of its creator, the Emperor Hadrian, and of his successors down to Septimus Severus. The original structure was a marble-covered cylinder, about two hundred and forty feet in diameter, standing upon a substructure about three hundred and forty-two feet square. It is not known surely how the composition above the central cylinder was finished, but the total height is thought to have been about one hundred and sixty-five feet. During the seige of 537, the tomb was used as a fortress by the hardly-beset citizens, and the statues which surmounted the main cornice, and probably the materials used in the superstructure, whatever this may have been, were thrown down by them upon the heads of the besiegers. From 923 A. D. to the present time the Tomb of Hadrian has been used as a fortress by whatever party, secular or ecclesiastic, may at the time have been in the ascendant, and it has borne a part in many revolutions and seiges.

COMPETITIVE DESIGNS FOR A $5,000 HOUSE, SUBMITTED BY "*Bowlder*" AND "*Hilltop*."

FOR comments of the jury on these designs, see elsewhere in this issue.

COMPETITIVE DESIGN FOR A TWO-STORY CHURCH, NEWTON, MASS. MR. C. H. WALKER, ARCHITECT, BOSTON, MASS.

THE church was to have Sunday-school rooms, library, ladies' parlor, kitchen, etc., on ground floor, and church above to seat six hundred and fifty. Material, Rockport seam-face granite, trimmed with Dedham granite. Estimated cost, without heating, $38,000.

A SCHOOL-HOUSE, MOBERLY, MO. MESSRS. RAMSEY & SWASEY, ARCHITECTS, ST. LOUIS, MO.

THE front gable is timbered work with cement plaster, the bay and ventilator of copper, the walls of St. Louis pressed brick, and Euclid stone for the base and sills. The building will cost $10,000, exclusive of school furniture and furnace.

SKETCH FOR A COUNTRY-HOUSE. MR. E. T. MACAULAY, ARCHITECT, ELMIRA, N. Y.

AMERICAN ARCHITECT COMPETITION FOR HOUSE COSTING $5,000.[1]—III.

"*BOWLDER.*"—The novelist is not isolated. Dining-room is too narrow. Second-story plan is good. Interior details are hurried in drawing, but with good ideas. Exterior is good, better than it seems in the drawing. Staircase-window coming as it does between two porches and with sills stepping up with the stairs makes the wall look spotty. Windows stepped in this way are very seldom good: their sills follow a diagonal line which harmonizes with nothing else. The design is simple in mass and with sufficient shadows. Rendering is uncertain, though not bad in general effect.

"*Hilltop.*"—No necessity for winter kitchen and laundry. Waste room in hall. Novelist is isolated. Details are good. The use of shingles in an interior is one among many attempts at novelty which belong in the same category with rustic staircases, green-slag mantle facings, etc., that is, wherever a crude material fitted either for defence against weather, or else to be used amongst materials equally unwrought, is brought within doors, near the eye, and in direct contrast with well-finished surfaces. Exterior is of good design except dormers, which are not sufficiently dignified for rest of house and in perspective are out of scale with it. The porch does not combine with house-wall: it seems merely to adhere to it. Rendering good.

[To be continued.]

KANSAS CITY EXCHANGE COMPETITION.

IN fulfilment of the promise made in the printed *Instructions* issued to the competitors, we present for their information this account of the results of the Competition.

Fifty-three designs for the Exchange Building were sent in on the 15th of June. Of these, ten admitted light and air by means of several small areas or wells, twenty-five mainly by a large area at the back, six by a large area at the front, the building occupying three sides of an open court, and nine by a large court in the middle of the building which in two of the designs was covered by a skylight.

The Large Hall for the Board of Trade occupied in one design the basement, the first, second and third floors; in three, the first, second and third floors; in eighteen, the second and third floors; in seven, the second, third and fourth floors;

[1] Continued from page 42, No. 552.

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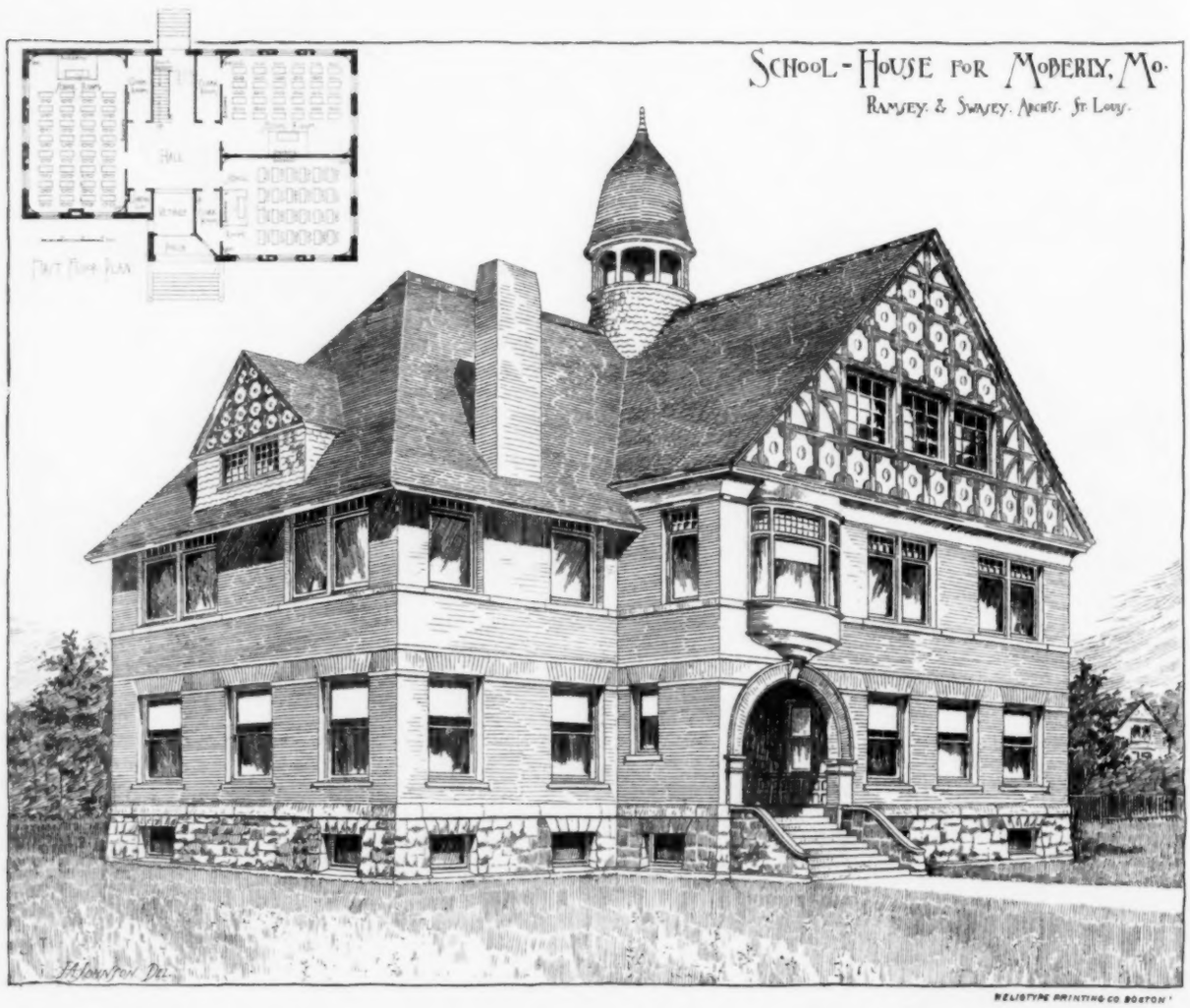
Sketch for Country House.
F. Thornton Macaulay Archt. Del



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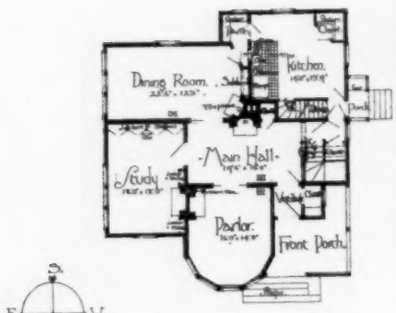


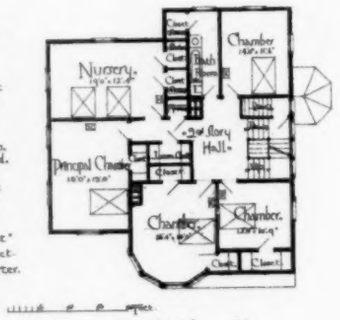
First Floor Plan.

Note.

The Basement is divided into Laundry, Furnace Room and Store Room. A Water Closet will also be in Basement. The fresh air inlet will be on West side. The Water Supply is taken from Cistern which is situated in Basement under the Kitchen. The Leaching Cesspool is to be situated 100 feet from House on East side.

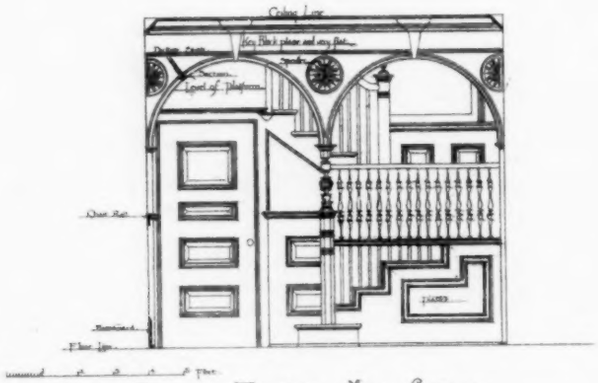
The Attic is divided into a Chamber and Childrens' Play Room. The remainder being left unfinished. The Water Tank is also in Attic just behind chimney and over the Bath Room. The space around the 10" iron pipe (Furnace flue) is to be used for ventilation.

Bricks used as "Tapping Out" of Chimneys to be "selected", and laid in red morter.



Second Floor Plan.

Elevation of East Side.



Elevation of Main Staircase.

American Architect Competition.
for a $5000 House - to be built on
A Barren Hillside
Submitted by "Boulder."

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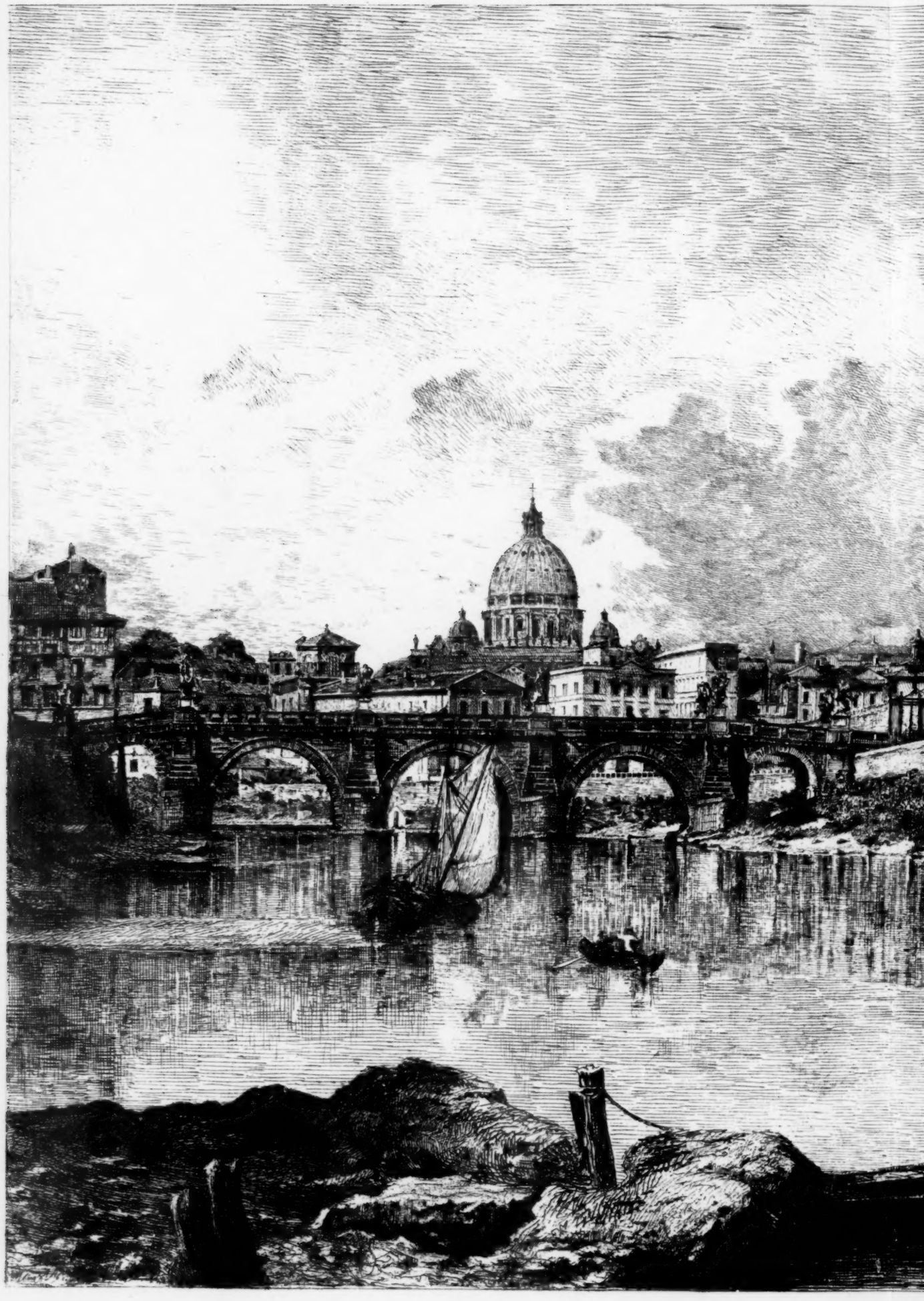
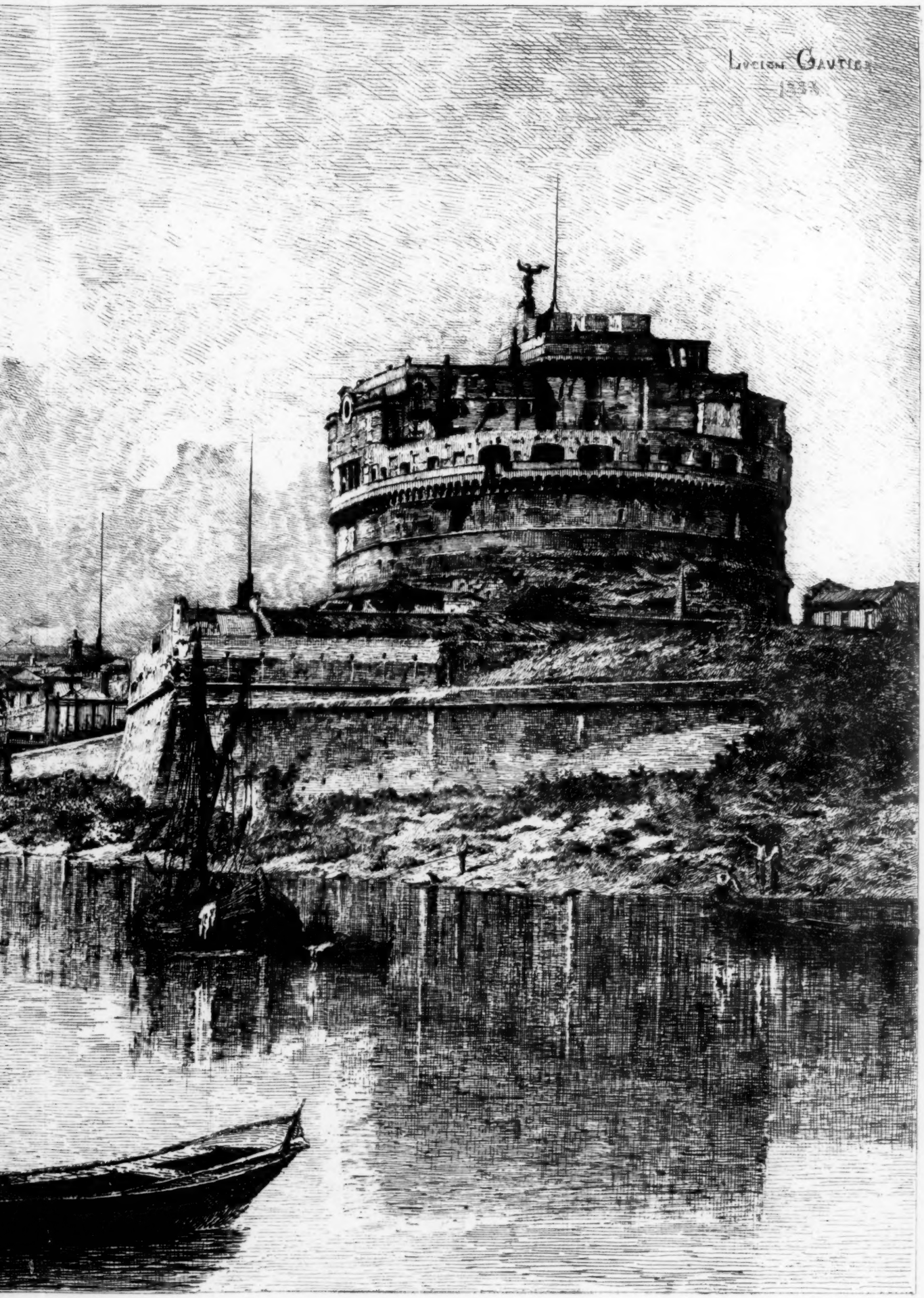


ROMA. CASTELL

ED, 1886, TICKNOR & CO.



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ELLO S. ANGELO.

Civic Plan.
HELIOTYPE PRINTING CO. BOSTON

American Architect and Building News, July 31 1886. No. 553

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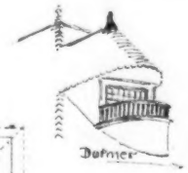
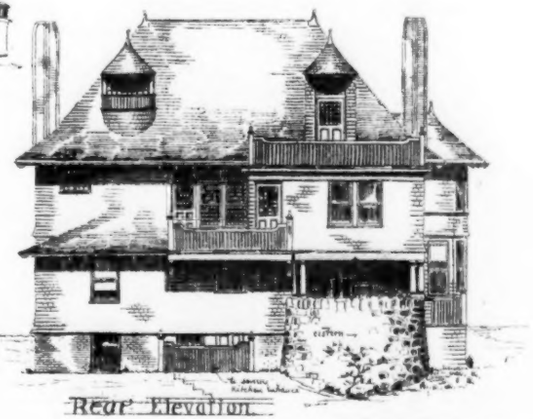
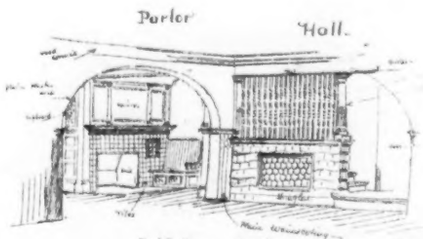



Rear Elevation.

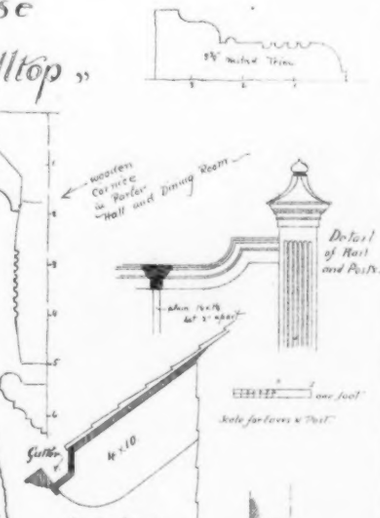


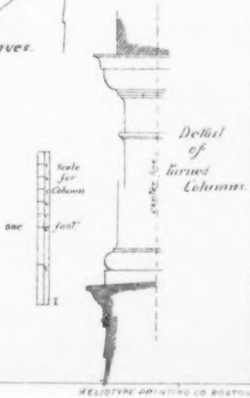
Interior looking From Dining Room.

$5000 House By "Hilltop"

Note. Summer Kitchen 15'6"x15'6" in basement. Laundry also.

Attic Plan.





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C. HOWARD WALKER, ARCHT.

DESIGN FOR A TWO-STORY CHURCH, NEWTON, MASS.

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in two, the second, third, fourth and fifth floors; in one, the third and fourth floors; in twenty, the fourth and fifth floors, and in one, the fifth floor only.

In twenty-one, the large hall was in the middle of the front; in eighteen, at the end, upon a side street; in eight, it faced the front and side street; three were upon large courts in the rear; one upon the court-yard in the middle of the front; one extended the whole length of the front, and one was in the middle of the rear.

In thirty-one of these designs the safes were distributed in stacks throughout the building; in eleven they were concentrated in the basement; in ten, they were shown in the basement and first floor, and in one, on the first floor.

The Restaurant, in thirty-two designs, was placed in the basement; in eighteen, at the top of the building, and in three, upon the first floor.

In respect of style and external treatment sixteen were designed in some variety of Roman or Renaissance architecture, nine with a tolerably strict, and nine with a somewhat free use of Romanesque or round-arched mediæval motives, and not a single one in the pointed Gothic style, either modern or mediæval which, twenty years ago, or even ten years ago, was almost universal. There were seventeen designs, two or three of great merit, in which it was difficult to detect any special historical influence.

On opening the seals it appeared that in two cases two sets of drawings came from the same hands, in another three, and in another four. The result serves, however, rather to commend the course of the successful competitors, who made numerous duplicate designs for their own use, as a means of study, submitting to the Committee only the one they believed to be the best.

The provisions of the printed instructions proved to have been carefully complied with in every case, except that in one design the building had windows on the north side, where the plan furnished showed a party wall, and one design showed a building of eight or nine stories, disguised as mezzanines, instead of five or six. These were accordingly thrown out of consideration at the start, as were also some drawings of details which accompanied another of the designs.

A list was then made of fourteen which proved to have the best plans, and another of twenty-one, which had the most acceptable perspectives. Six designs were found upon both lists. To these six ten more were added from those of such marked excellence in either respect as to deserve further consideration. These sixteen drawings were then critically compared with reference to the provisions made for the general convenience of the public and of the Board of Trade, for lighting and natural ventilation, for office-room and rental, and for a suitable architectural character and expression, and the memoranda that accompanied them carefully read. They were then arranged in series under each of these heads, and those that stood highest on the greatest number of lists were then further considered on their general merits. Five of these were finally selected to send to the Building Committee as being on the whole distinctly superior to the rest, for one reason or another.

In estimating the area of the small offices, floor-space more than twenty-two feet from the windows was not counted, and in estimating their value, those upon outer walls were considered twice as good as those upon enclosed courts and areas.

This work, in which the professional adviser of the Association was aided both in the clerical labor it involved, and in the more difficult task of criticism and judgment by a number of his fri nds—the value of whose assistance he hereby gratefully acknowledges—occupied just a week. He then opened all the envelopes and reviewed his action in the light of the information they furnished, but without finding reason to change his mind. On Thursday, the 24th of June, the five selected designs were sent to the Building-Committee in Kansas City for their final judgment, with a written report, containing some comments upon the designs, but without any special recommendations. These reached the Committee on Monday morning, June 28th. This paper is printed below.

After diligent and almost continuous study, the Committee, on Wednesday, June 30th, came to a unanimous opinion. This they reported to the Exchange Building Association in the following terms:

"After a careful and detailed examinati n of these designs, your Committee rejected two as unsatisfactory, because in one instance the office rooms intended for renting contained too much floor-space to admit of a satisfactory rental from the building, and in the other instance, too large a floor-space was given to ante-rooms of little or no rental value. Of the remaining three, no one of which was entirely satisfactory, though each one contained very decided advantages of one character or another, the Committee finally rejected one because the Large Hall of the Board of Trade was without windows in the side walls, being lighted and ventilated through the ceiling, which your Committee was persuaded could not be satisfactory to the users of the hall. Of the two then left, your Committee finally selected the one marked '*Utilissimus*,' which was plainly the best of all for the lighting and ventilation of the offices, giving to the halls the best positions possible, and furnishing the largest number of offices for rent in the best groupings for advantageous use, and on the whole, promising probably the largest returns of income, and admitting of the correction of all supposed defects with the least interference with the main features of the plan."

Upon being assured by their professional adviser, who had meantime been summoned from New York, that the alterations suggested could easily be made, and that the author of the plan in question was entirely deserving of their confidence, the Committee formally voted to accept this design. The envelope containing the names of the five selected competitors being then opened, they found the selected design to be the work of Messrs. Burnham & Root, of Chicago, the other four, in the order of their preference by the Committee, coming from Messrs. Edbrooke & Burnham, of Chicago; Messrs. Weston & Tuckerman, of New York; Mr. John L. Faxon, of Boston, and Mr. W. W. Clay, of Chicago.

Although only these five designs were submitted to the Committee for consideration, all the perspectives were sent to them for their information, and to gratify a reasonable curiosity.

The Committee took no steps towards determining the relative or absolute cost of the buildings shown, believing that this was largely within their own control, being determined by the special materials or methods of construction they might adopt. These points they could most profitably consider in consultation with the author of the selected plan.

The course of this competition has thrown some light upon several questions, which, in discussions upon this subject, have been much debated. It has been questioned, for instance, whether it is desirable to have drawings made in perspective, the impression being a prevalent one that such drawings are likely to be misleading and deceptive, giving a much more favorable impression of a design than it deserves. However this may be with perspectives finished in water-colors, the contrary seems to be conspicuously the case with drawings in line, such as were asked for in this instance. The perspectives have in this case served mainly to bring into prominence defects of design that were not noticeable in the elevations, only those designs that presented a plane surface, almost unbroken by recesses and projections, seeming to be secure against a very serious disparagement when thus presented. In other cases, the composition of wall and window, plain and decorated surfaces, which in elevation looked all right, would often, when put into perspective, fall into shapeless disorder. Such drawings seems then, especially where the point of view is taken as near the building as in this case was necessary, rather to bring out the latent defects of a design than to invest it with fictitious merits.

It has been a matter of debate, also, whether the practice of concealing the identity of competitors under a fictitious name was of any value, the opinion obtaining that it was always easy to penetrate the disguise. The contrary has been the case, however, in this instance, the most confident convictions of half-a-dozen tolerably experienced architects having been ludicrously set at nought when the real authors of these designs became known. Only one or two correct guesses were made at all, and these took the form rather of surmise than of definite recognition.

This *incognito* has, moreover, proved to be of great practical convenience in judging the designs. Although, as was distinctly set forth in the paper of *Instructions*, the Committee intended to be guided in their final choice by personal and other business considerations, as well as by the relative merit of the designs submitted, they were very glad in examining the five sets of designs that came before them, as their professional adviser had been in selecting these five, to keep the two questions apart, and to be able to discuss the drawings solely upon their merits, leaving other matters to be considered when their time came. It was felt that to have entertained both questions at once would have been greatly to complicate and embarrass the discussion.

Some light has also been thrown upon the vexed question whether the final choice among the competitors should lie with a building-committee or with the experts whom they may bring into their counsels. It is certainly best that a committee should put the chief labors of examination and inspection into the hands of professional inspectors, if for no other reason than this, that in no other way can they so effectually inspire confidence, and prove themselves to be above partisanship and intrigue as by putting the exercise of favoritism out of their power. But it is not necessary to this end that they should have no voice in the selection, and questions may well arise, as in the case in hand, which demand for their solution an act of absolute and arbitrary choice which only the proprietors, or the committee representing them, are in a position to exercise. What relative importance to attach to rental, convenience and general architectural expression and character and what, on the whole, convenience will require, are not questions for a professional expert, but for his clients. In the present case, the professional adviser of the Association was able to select five designs with a certain confidence that each was, on its own ground, superior to the remaining forty eight. But the differences between these five were differences rather of kind than of degree, raising questions, as is shown in the Committee's report to the Association, which only the owners could answer. It would have been impossible and improper, in this case at least, for any professional adviser to make their choice for them.

This competition has demonstrated, also, what there has been too much reason to doubt, that if proper regulations are made, it is possible to carry on such a contest, and bring it to a conclusion without the exercise of any personal influence whatever on the part either of the judges or of the contestants. The Committee and their adviser had, in this case, no knowledge or intimation of the authorship of any of the designs until after their judgment was formed. The competitors, also, with one or two insignificant exceptions, abstained

absolutely from any attempts to exert any outside pressure upon them, and in these cases were signally discomfited.

The designs sent in have not been seen by the successful competitor, nor by any persons except those mentioned above as having been specially invited to inspect them, and they will be forthwith returned to their owners, unless they otherwise direct.

Edward H. Allen,
William R. Ware.

REPORT.

New York, June 24, 1886.

Edward H. Allen, Esq., Chairman of the Building Committee of the Kansas City Exchange Building Association:

Dear Sir,—In fulfilment of the task intrusted to me by the Exchange Building Association, I have examined the fifty-three designs for the Exchange Building which have been sent in to me, and herewith enclose to you, in accordance with the provisions of the printed instructions, those which I find to be the best among them, five in number, with the following comments:

These five designs are, in my judgment, distinctly to be preferred, for one reason or another, to any of the remaining forty-eight. Any one of them, if carried out substantially as shown in the sketches, would give the Association an excellent and satisfactory building. This being so, it is for the Committee to decide which, on the whole, best meets their wishes as promoting their own convenience, or as furnishing a good business investment, or as possessing a suitable architectural character.

1. The design designated by a "*Corinthian Capital*" offers the largest number of offices to be let for business purposes—one hundred and five in all, besides four railroad offices. Of these one hundred and five, eighty are upon external walls, and look into the streets, and twenty-five are lighted from an interior court. This court is, however, of exceptional size. The safes are concentrated in the basement, where the restaurant also is placed.

The large hall for the Board of Trade is on the second story, and is lighted entirely from the ceiling, being under the large court. This leaves the main part of the building for offices, which accounts for their exceptionally large number.

The exterior of the building is dignified and monumental, without affectations of any kind, and in general expression and character is entirely suited to the purpose for which it is designed.

2. The design marked "*Utilissimus*" is second in number of offices, having, besides eight railroad offices, ninety-eight smaller offices. All but six of these are upon external walls, and thirty of them are connected with secondary rooms in the rear. If these are counted separately, the total number of small offices is one hundred and fourteen.

In this design, besides the safes accumulated in the basement, a considerable number are distributed through the building. The restaurant and most of the water-closets are in the fifth story.

The large and small halls occupy the fourth and fifth floors in the northern wing of the building, and the offices connected with them the southern wing of the fourth floor.

Light and air are introduced into the interior of the building by a large court, open to the street upon the south side. At the back of this court is an excellently-designed tower, giving the building an effective and striking individuality. The rest of the design, however, seems to leave something to be desired in point of architectural character and expression.

3. The design marked with a "*T-Square and Triangle*" is the third in respect of the number of offices and the first in the amount of floor-space given to them. Besides four large railroad offices, there are eighty-nine small offices, of which sixty are on external walls and twenty-seven on an area. Thirty-nine of these upon the outside walls are connected with twenty-three interior rooms. If these are counted as separate offices, the whole number amounts to one hundred and ten.

The restaurant is in the basement, and the safes are distributed in stacks through the building.

The large hall occupies the fourth and fifth stories at the east end, the offices attached to it, with the small hall, filling al lthe rest of the fourth story.

The exterior is treated in the Romanesque, or round-arched mediæval, style now coming into vogue, and is, perhaps, more agreeable in itself and more suitable for a building of this kind than any of those designed in this manner. It is quite free from extravagance and eccentricity.

4. The design marked "*Anti-Cyclone*" shows five railroad offices, all double, thirty-nine exterior offices, of which twenty are double, and seventeen on a court, of which twelve are double, making fifty in all. If the extra rooms are counted separately, the whole number amounts to eighty-eight.

A few safes are shown, distributed through the building. The rest are in the basement.

The large hall occupies the second, third and fourth stories at the west end, the offices attached to it and the small hall being in the second story.

The external aspect of this design, though not following the prescriptions of any special historical style, presents a simple and dignified architectural composition, eminently adapted to the important place this structure is meant to take among the public buildings of the city.

This is one of the few designs submitted which appears as well in perspective as in elevation. The tower with which it is adorned is unusually well composed, simple and elegant. It is to be noticed, also, that the two external courts on the rear, though not so wide as they well might be, not only give light and air to the rear offices and water-closets, but serve to detach the building from the rest of the block, to the great advantage of its appearance—making it virtually an isolated structure.

5. The scheme marked with "*A Pair of Compasses and a Carpenter's Square*" gives five railroad offices, and sixty-one others, all single, of which forty-seven are exterior, nine on a small area, and five on an interior well.

The large hall is larger and higher than in most of the others, occupying the whole of the second, third and fourth floors in the eastern end of the building. The offices attached to it, and the small hall, occupy the rest of the second floor.

In many of the designs submitted, the large hall was planned in the middle of the front, either upon the second and third, or in the fourth or fifth stories. But none of the competitors who adopted this arrangement succeeded, in my judgment, in giving it a satisfactory architectural treatment. Yours respectfully, William R. Ware.

THE LIFE AND WORK OF SIR CHRISTOPHER WREN.[1]—I.

Fire Place in State Bed Room, Ducal Palace, Venice.
After Sketch by J. Vacher, A.R. Sketch Book, London.

Sir Christopher Wren, only son of Dr. Christopher Wren, was born at East Knoyle, in Wiltshire, on October 20, 1632. It will be an encouragement to some of us to know that he achieved greatness in spite of ill-health, which, like Tom Hood, he "enjoyed" during youth. In consequence of his delicate health his early education was given at home by a private tutor. Subsequently he joined Westminster school under the head-mastership of Dr. Busby. As is well known he early showed a special genius for mathematics, and on that account he was placed before long under the care of Dr. William Holder, a learned man of considerable and diverse talents. The special bent of Wren's mind early took a practical form in the invention of numbers of machines and instruments for the purpose of astronomy, agriculture, and many other sciences. Indeed, there seems to have been no subject of any kind occupying the attention of scientific men of his time in which Wren was not listened to with attention, or in which he did not distinguish himself. He made a special study of gnomonics, or the science of dialling, at that time a most important subject of investigation, and developed the science in many directions. Among other things he made for Dr. Scarborough a wonderful set of models, showing the actions of the muscles of the human body, unfortunately destroyed in the great fire. His mind was most versatile and comprehensive, and his inventions and treatises embraced all conceivable subjects, from "Improved Methods of Whale Fishing" to "Sham Marble Pavements," including "Cheap Bed-Hangings," and, as a matter of course "Perpetual Motion." He also made some valuable suggestions for the establishment and conduct of a kind of meteorological office for collecting statistics of natural phenomena, with a view to the amelioration thereby of the condition of mankind. It is held by some that Wren invented the barometer, but this seems a little doubtful. He made many important developments of the idea, however. In the year 1646, at the age of fourteen, Wren was admitted at Wadham College, Oxford, as a gentleman commoner.

In 1650 (aged eighteen), he received his degree of B.A. at Wadham College; in 1653 that of M.A., and was elected in the same year to a Fellowship of All Souls. In 1657, as a mere boy, he became Professor of Astronomy at Gresham College, London, and in 1660 Savilian Professor at Oxford. He received his degree of Doctor of Civil law at Oxford in 1661. In 1680 he was elected president of the Royal Society. This society took its origin in some informal meetings of a few friends interested in similar subjects, amongst whom Wren took the place of a leading spirit. When the suggestion was made to organize a society of a definite nature and for a settled purpose, Wren took up the idea with great vigor and drafted the charter under which the society was established.

It is stated that in the "Parentalia" that among Wren's many other achievements he invented the art of engraving in mezzotint. He was also the originator of the system of injecting drugs into the blood, which has been of such immense importance to the doctor's art.

So far as I can discover, Wren's first architectural work was the building of a chapel to Pembroke Hall, Cambridge, for his uncle, Bishop Wren of Ely. The bishop had been imprisoned for eighteen years in the tower, for High Church practices, and on his liberation he erected this building as a thank-offering. The first stone was laid May 13, 1664, Wren being then thirty-one years of age. The building has been restored by Scott, who added twenty feet to its length.

Apparently in the same year (1663), Wren's name was put on the list of commissioners for the repair of St. Paul's Cathedral. Various schemes and arrangements were discussed in connection therewith, but nothing particular was done until the beginning of 1666—the year of the great fire—when Wren drew up a report and sketched out his ideas for the restoration. His plan was to Romanise the nave, the Norman arches of which seemed to him to lend themselves easily to this treatment, and to build an immense domed rotunda at the crossing, cutting off the outside angles for this

[1] A paper read before the St. George's Art Society by Mr. Arthur Keen.

purpose. The plans and estimates for this work were ordered on August 27, 1666, but six days later the great fire brought the labors of this commission to a close by destroying the object of their consideration. It was in the preceding year (midsummer, 1665), that Wren made a journey abroad, the only time, I believe, that he left England. The country he visited was France, and he spent most of his time in Paris, where the great palace of the Louvre was recently commenced. He was much struck with Bernini's design, and indeed stated that he would have given his skin to possess it. The cautious old Italian, however, only gave him a rapid inspection of the drawings, and would not allow him to copy them. Wren visited most of the palaces and villas of any importance in France, and must have reaped many ideas from them, although the influence of the French work is not very apparent in his own designs. He never went to Italy, and I am inclined to think — although, I suppose, it is heresy to say so here — that it is as well, on the whole, that he did not. His work would probably have been far more delicate and refined in detail if he had done so; but I cannot help feeling that he would inevitably have lost much of the originality and freedom of treatment which is undoubtedly the great charm of his work, and which fit it so admirably for this northern climate, and particularly for this City of London, where he was destined to find the subjects of his chief and most successful efforts. The inferior and even commonplace character of the detail in much of Wren's work is certainly very lamentable and a great drawback to one's enjoyment of the general composition; but it is, to my mind, quite a question as to how far Wren is himself responsible for this. He was so overburdened with work during the few years in which the city churches were erected that it is hardly possible that he could have given as much personal attention to the buildings as they needed, and he was probably compelled to leave the carrying out of his work, to a large extent, to less capable hands and heads than his own. It has to be remembered that the system of rapid and workmanlike drawing now in vogue in all busy offices was in Wren's time quite unknown, and it was impossible for the master to express his ideas and intentions respecting the carrying out of his work in the complete and definite way adopted by modern architects and their assistants.

The pencil of a ready draughtsman will give more instruction in five minutes than the tongue of a ready speaker will in forty. In cases where Wren was able to give proper attention to the work the result is admirable. In the church of St. Stephen's, Walbrook — to the arrangement of which, I understand, Wren gave particular care, and the building of which spread over seven years — the detail is very good indeed, and the whole interior works out as a perfect gem of architecture. It seems to me that the people who perpetrate the greater number of our dissenting chapels would do well to build on the model of such churches as this, which presents all the conditions usually considered essential in such buildings, treated in a manner at once graceful and dignified.

Wren returned from France some months before the plague ended, and applied himself with other members of the Royal Society to a careful study of the disease and its remedies, with a view to exterminating the enemy. The great fire, however, accomplished this for them in a far more summary and complete manner than they ever dreamt of, and Wren's thoughts were turned at once in quite a new direction.

The king set him to work immediately on the cathedral, which was to be demolished and rebuilt. The first design produced, after much preliminary discussion and planning, was a church on a thoroughly classical plan, consisting of a little more than a great dome with a surrounding aisle and entrances. Wren was so pleased with this production that he made a large model of it for the benefit of the uninitiated. A controversy naturally started at once on the merits of this plan, and waxed very fierce. Many of the members of the chapter preferred to have a building on a more orthodox plan, after the fashion of their existing Gothic cathedrals. The opinion of these worthies finally outweighed that of their colleagues, and the architect set to work again on new lines, and produced a design more curious than beautiful, combining central spire and dome in one composition. The king discovered this design to be "very artificial, proper, and useful," and gave his royal assent to it, and ordered the building to be proceeded with forthwith. This royal assent is dated May 1, 1675. Fortunately, the king gave Wren the liberty "in the prosecution of his work to make some variations, rather ornamental than essential, as from time to time he should see proper," a permission which he interpreted in the most liberal manner possible, for the cathedral, when completed, was no more like this design than its predecessor.

The pulling down of the old work preparatory to rebuilding was a long and difficult job. The mighty tower of the old cathedral, two hundred feet high, and with piers fourteen feet thick, seemed such a formidable object to demolish that Wren resorted to the expedient of blowing away one of the piers with gunpowder, a process that was at once simple and effectual. To those who meditate operations of this sort it will be interesting to know that only eighteen pounds of gunpowder were necessary for the carrying out of such an undertaking. Another explosion indulged in in Wren's absence having been attended with disasterous consequences, the remainder of the building was gently battered down with an enormous battering-ram "after a good Roman manner." In exploring the soil for foundations Wren found that the old church had stood on a layer of hard and close pot-earth about six feet thick. Under this was loose, dry sand which poured out like a fluid when excavated into, and below this again, at about low-water mark, water and sand mixed with shells, and under this was hard, firm beach, with the solid London clay below it. It appeared that the site had once been part of a wide estuary, along which, when it was dry, the wind had driven the sand and made the hill on which the cathedral stands, the pot-earth being simply the finest of the sand which had naturally found its way to the top. At the north-east angle of the choir the pot-earth had all been taken out and used by the potters of old time, and so here Wren had to run down a ten-foot pier to the hard beach forty feet down, and from this he turned an arch which carries this corner of the building.

Very little information is given in the "Parentalia" respecting the erection of the cathedral, but fortunately we have the building before us just as Wren left it to examine for ourselves. It has its faults, as every one knows — very glaring ones, according to some authorities — but I suppose there never was a building yet that some one or other could not find fault with on one account or another, and it seems to me on the whole, that St. Paul's is a building that may hold its own against any church of its own date, and one that the city has every reason to rejoice in and be proud of.

The chief fault found with the exterior is, of course, with the carrying up of the aisle walls far above the roof to hide the buttresses which support the nave vault. This was, however, the result of a choice of evils, and it has been managed so skilfully that a critic must be very hard-hearted who lays much stress upon it. As for the question of the double dome — the exterior being so much higher than the interior — I fail to see that this is any worse than the use of a tall spire as the roof for a low tower. No power on earth could devise a dome — unless an isolated one — that should look well both inside and out without resorting to some such expedient.

The chief faults found with the interior are, I believe, in the breaking of the arches into the frieze of the main entablature, and in starting the arches of the vaulting from an attic order instead of directly off the cornice. With regard to the first of these questions I certainly think it is a misfortune, and an unnecessary one. The effect of the frieze broken up into short bits over the pilasters only is, to my mind, most uncomfortable and unsatisfactory. Wren defended this arrangement himself with more or less ingenuity, but I think he would have done better by making frieze and architrave run boldly along over everything.

With regard to the springing of arches from an attic order this again was a choice of two evils, and I think that the lesser one has been accepted. It would be impossible for a vault springing from the top of a bold and well-proportioned cornice of great projection, such as the one in question was obliged to be, ever to look well, however ingeniously treated; and the effect of the existing arrangement, if looked at apart from theoretical considerations, is so pleasing that I think little fault should be found with it. Classical features were never designed to accompany arch construction, and, if we consent to the amalgamation of the two forms, we must accept the accompanying drawbacks as quietly as possible. Other faults are, of course, found with the building; indeed, some people would not be satisfied even if an angel from heaven designed work for them, but they are of minor importance, and need not be considered here. I always feel myself that more color decoration is needed inside if only to give scale to the building, but this requirement will, no doubt, some day be discharged.

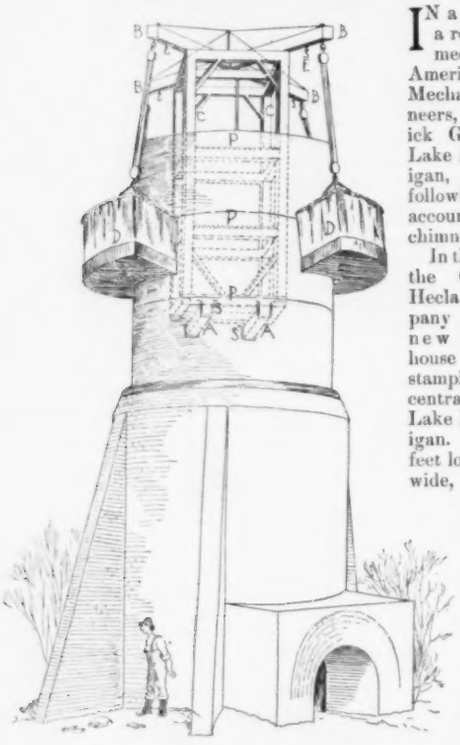
In excavating for the new cathedral and other buildings, many discoveries were made of remains of earlier times, and Wren worked out a careful, and I believe very accurate plan of the arrangement of London in the Roman times.

The first cathedral, built on the present site, dated from this period. It was demolished at the time of Diocletian's persecution of the Christians. In the reign of Constantine another church was built on the old foundations, and this one shared the same fate as its predecessor, being destroyed by the Pagan Saxons. It was restored again, still on the old foundations, when Ethelbert, King of Kent, embraced the Christian faith. This church, together with the whole city, was destroyed by fire in 1083. Mauritius, the then Bishop of London undertook the rebuilding, and produced, with the aid of an ancient tower in the neighborhood for a stone quarry, the church which, with some alterations and additions to the east and west, continued till the great fire of 1666. The first stone of Wren's building was laid in 1675, and the structure was completed in 1710. I suppose it is the only cathedral of any size ever built entirely under one architect; all honor to the people and king of that time that they persevered so well with such an enormous undertaking, when funds and resources were in such a desperate condition in consequence of the recent destruction of the entire city. The money for the work was mostly raised by a small tax on all coal brought into the city.

[To be continued.]

SIR PHILIP CONLIFFE-OWEN RECEIVES THE ORDER OF THE BATH.— Queen Victoria has just conferred the star and collar of the Order of the Bath upon Sir Philip Cunliffe-Owen, Director-general of the South Kensington Museum. Sir Philip was in 1876 a British commissioner to the Centennial Exhibition at Philadelphia, and was the recipient of one of the four great silver memorial medals struck by the Centennial Commission.

A NOVEL CHIMNEY STAGING.



In a paper read at a recent Chicago meeting of the American Society of Mechanical Engineers, Mr. Frederick G. Coggin, of Lake Linden, Michigan, supplied the following interesting account of a novel chimney staging:

In the fall of 1885 the Calumet and Hecla Mining Company completed a new brick boiler-house for their stamping and concentrating works at Lake Linden, Michigan. It was 206 feet long and 70 feet wide, giving room for 14 fire-box boilers, whose shells are 90 inches in diameter, with a total length of 34 feet. The chimney designed for this boiler-house was to be of wrought-iron 13 feet 7 inches in diameter and 165 feet high, above the brick base upon which it stood, and the top of the latter was 20 feet above the ground, making a total height of 185 feet above the surface. The courses were 5 feet high with four sheets in each course, the ends and edges butted together, the joints being covered with straps riveted to the sheets on the outside. The first 10 courses were $\frac{3}{8}$ inch thick, the second $\frac{5}{16}$ inch, the third $\frac{1}{4}$ inch, the top three courses $\frac{3}{16}$ inch thick. The late arrival of the material for the chimney, with other circumstances, brought the commencement of its erection rather late in the season, so that it became a serious question as to whether it could be completed in time to allow the brick lining to be put in before the freezing weather set in. In fact, it became evident that with the ordinary method of staging it could not be done. Such a staging would have required 10 uprights of 8 x 8 inch timber, with the bracing necessary to hold them in position, and girting, and provision for a platform every 5 feet — *i. e.*, for every course — sufficiently strong and wide to allow the workmen to stand outside for holding rivets and bolting together, all requiring not less than 26,000 feet of lumber.

Such a staging would have to be put up in sections, during the operations for which the ironwork would have to be suspended, and the time put upon the staging and platforms would be nearly as much as that for putting the plates in position and riveting, and the expense full as much. But, regardless of the question of extra cost, the delay which such a staging would occasion made it imperative to devise some more rapid method for raising the chimney, and the result was the plan illustrated in the initial cut. This consisted of a frame about 9 feet square, with four 8 x 8 inch uprights 16 feet long, suitably braced and bolted together, with a platform at the bottom, one about 4 feet from the bottom, which carried the workmen while riveting, and one still higher for carrying the forge, etc., the platforms being indicated by the letter P. Upon the top of this frame were four arms, B, jointed at the centre, through which it was bolted to a cross girt, but so as to allow it to swing freely. To the ends of these arms were suspended the cages D by blocks and falls, as shown. These cages extended a little more than one-quarter round the chimney, and consisted of a segmental platform about 3 feet wide, with a railing of gas-pipe and covered with canvas to protect the workmen from the wind, and prevent the possibility of their falling. The whole thing required less than 1,000 feet of lumber. The frame having been bolted together within the chimney base, the process of erection might be begun. The cast-iron ring upon which the chimney was to rest having been put in place upon the top of the base, a loose platform was laid over the opening, and the first two courses were raised into place with a "gin-pole" and bolted together. Two snatch-blocks were then hooked onto the upper sheet near the two opposite corner-posts of the frame, at the bottom end of which were eye bolts, into which were hooked the hoisting ropes, which passed up through the blocks and down to the bottom through another pair of blocks on to the drum of a small steam-hoisting machine.

The temporary platform was then removed, and the frame was raised high enough so that the two sticks of timber A could be placed on the top of the base under the uprights. The cross-bars B were then put in place, and the cages D suspended, and the two courses were riveted together. The gin-pole was now laid aside, and the third course was put in place by the method to be used from that point to the top, the ease and facility of which are worth noting. In the arms B, just back of the eye bolts to which the cages were suspended, were other eye-bolts, E, into which was hung a snatch-block, over which was passed a rope leading from the hoisting machine, and hooked into the sheet upon the ground. As the sheet was raised the cage was swung out to allow it to pass up behind it, the sheet swinging naturally and easily into place, where it was secured with bolts. When the whole course was thus secured the snatch-blocks were hooked onto the top of the sheet as before, and the frame raised as before, so that the loose cross-beams A could be laid in the stirrups S, which had previously been bolted in place at the horizontal seam, and from this point up the frame, except when it was being raised, was resting upon the two cross-beams A hanging in the four stirrups, of which there were two sets, so that while the frame was hanging in one the other could be transferred to the seam above. There was, therefore, no delay, for as each course was riveted up and another bolted in place ready for riveting, but a few moments were required to hook on the snatch-blocks, raise the frame, transfer the cross-beams A to the next set of stirrups and drop the frame on to them. The sheet being riveted one-quarter round on the opposite side the cross-bars B were swung so that the cages covered the other two quarters, and the riveting was completed.

In this way, this travelling staging, carrying eleven men went to the top with no trouble whatever, the operations following each other in rapid succession, and within twenty-seven working days from the driving of the first rivet at the bottom the last rivet was driven at the top, including the hanging of three sets of guys and painting the chimney inside and out. A cast-iron capping having been put in place, a permanent iron ladder was hung from top to bottom. The cages were then lowered to the ground and the frame taken apart and dropped, two pieces of timber being laid across the top, from an eye-bolt in which were hung blocks and falls for the purpose of raising a platform which carried the masons and material for putting in an eight-inch lining, which was done in about twenty days. The blocks were then lowered and the cross-timbers dropped, and a completed chimney stood as a testimonial of the quickest time on record for such a job. The total weight of the chimney, including the base, ring, and cap is 100,105 pounds. The cost for the labor, including punching and rolling the sheets and straps, and all labor incidental to the erection, did not exceed two and one-tenth cents per pound.

BOOKS AND PAPERS.

THIS manual[1] appears as one in a series of hand-books adapted to the uses of intelligent students of the formative arts, and edited by Mr. Sparkes, the principal of the National Art Training School of South Kensington. This, perhaps, is the nearest English equivalent for the patronage of the French Ministry of Fine Arts, under which the original series was brought out by the well-known art-publisher, A. Quantin. Otherwise the title, with the memories of ponderously scientific German works that it awakens, might frighten the "curious spirits" for whom the book is primarily intended, next to classes in schools of art and other institutions of an advanced grade. M. Collignon's position as professor of classical archæology and art at the *Faculté des Lettres* (Sorbonne) of Paris is a guarantee of its scientific character. The subject-matter is disposed somewhat on the lines of Otfried Mueller's system. The origin of Greek art, architecture, sculpture, terra-cotta figurines, painted vases, coins and engraved gems, bronzes and jewelry are treated of in seven "books," which are subdivided so as to take proper account of local schools and technical categories, as well as of the chronological development. The author admits that he has conformed in this arrangement to the principle of expediency, like the director of a museum, who disposes its treasures to best advantage in halls of given number and position, different in size and form. His illustrations betray a similar compromise. Without neglecting the most famous antiques, he has endeavored to avoid the uniformity of selection that makes most modern hand-books of ancient art so uninteresting to the initiated. The cuts are from original drawings, and as large and plentiful as was possible. Thus the general impression the author aimed at is secured, even to those who only turn the leaves. There is a certain relief, now and then, in seeing specimens of inferior excellence alternating with the acknowledged chefs-d'œuvre. But the majority of the less noted antiques from which much of the illustration is drawn are far from inferior. Take, for example, the subject of Figure 139, a simply-attired girl placed between two flying love-gods, whose figure served as the foot of a bronze mirror. No large statue could be more finely plain. Where departure from the beaten track is so much the rule, it is no matter for surprise if some of the objects selected have been challenged as not being of quite certain authenticity. Among these is the relief of Herakles discharging an arrow, from the collection of M. Carapanos, the discoverer of

[1] "*Maxime Collignon*," a Manual of Greek Archæology, translated by John H. Wright. Cassell & Co.: London, Paris, Melbourne and New York. 1886.

Dodona (Fig. 36), which was recently signalled in the *American Journal of Archæology* as not a veritable early Greek sculpture. In the text, many alterations attest the author's willingness to take back opinions time and recent archæological discovery have not confirmed. In treating of Phœnician influences, M. Colignon once assumed that Dorian sculptors came particularly under the sway of the Punic models. In the translation we read: "Phœnicia did not possess a style sufficiently original and distinct to impress itself upon the earliest Greek sculptors."

The translator very probably originated many of the minor corrections noticeable throughout. Numerous additions and a few apt suppressions improve the lists of authorities that head the several chapters. The most commendable addition that has been made is a capital index, the typography of which clearly distinguishes the names of the ancient artists from their subjects, and these from the technical terms of ancient art. It will be seen that this English edition, prepared by a professor in an American college, has independent value. It is to be regretted that the translation is not always accurate. It falls far short of reproducing in English idioms the fibrous life of M. Collignon's style. To employ an archæological simile, it is not like the Roman copy in marble, which imitates an Hellenic bronze, with due allowance for the difference in the textures of the two materials, and an admixture of national flavor, so much as like the modern plaster-cast, opaque, neutral, and disfigured by threads. Some painful errors of the press for which the Atlantic Ocean is responsible, complete the likeness, by recalling the breaks and chips you find in your casts when they are unboxed. But, like these, they may be mended, for the manual is so splendidly suited to purposes of instruction in all the schools where the history of art is taught, or ought to be, that a second edition will, doubtless, soon be called for. ALFRED EMERSON.

COMMUNICATIONS

[*We cannot pay attention to the demands of correspondents who forget to give their names and addresses as guaranty of good faith.*]

HYDRAULIC LIMES.

GREENVILLE, S. C., July 23, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Some limes (those slightly hydraulic), dark and in powder, though not acceptable for plastering are equally good, I believe, for bricklaying.

I have never used any of the above, and have just been called on to pass upon some. The lime in question is perfectly inert after mixing with water, and a lapse of time sufficient to thoroughly slake good fat limes.

I have reserved my judgment, and if you can advise me in your issue to be of Saturday, the 31st of this month, it will be very acceptable and appreciated.

The lime in question is almost all powder, with lumps varying from three inches large diameter, to sizes about as large as a hazle-nut.

I would like to know how soon mortar made from same should bear the heavy pressure of one's finger without indentation, provided it is exposed in a thoroughly dry place and to a hot sun.

Yours respectfully, A SUBSCRIBER.

[If you are right in calling the lime in question an hydraulic lime, do not be too impatient if it slakes slowly and without much ebullition, as it is the nature of hydraulic limes to behave so, "ordinary hydraulic" lime requiring an hour to slake, while "eminently hydraulic" lime is very uncertain, and may take several hours. It is to be remembered that hydraulic limes will set most satisfactorily if the work is kept rather moist; exposure to great heat will evaporate too quickly the water needed to complete the chemical change. If instead of being hydraulic, you have got hold of a "poor" lime it will be well not to use it if you can get a better brand. — EDS. AMERICAN ARCHITECT.]

THE EFFLORESCENCE ON BRICKWORK.

NEW YORK, July 20, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A correspondent in your last issue inquires for some material that will prevent the efflorescence on brickwork, and having employed with perfect success an English preparation called "Durresco," I can recommend him to use it. If color is no objection, the brick-red shade gives the handsomest finish, as it renders common or hard brick non-porous, prevents salts appearing, and does not scale or come off. Where fine pressed-brick are employed, and it is not desirable to change the color, three coats of transparent or liquid Durresco will effect the object your correspondent is anxious to obtain.

Yours truly, HOWARD FLEMING.

CORRECTIONS.

NEW YORK, July 23, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Your issue of July 10, referring to the Kansas City Exchange competition, names Watson & Tuckerman of New York as third in the order of merit among the selected five. Please kindly correct the name in your next issue. The firm intended to be so designated is Weston & Tuckerman. We have the honor to be, dear sirs, Your obliged servants, WESTON & TUCKERMAN.

NEW YORK, July 24, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The statement in the *Record and Guide* that any plans for the Freundshaft Club-House have been accepted, or even submitted by us, is entirely erronous. Yours respectfully,

DE LEMOS & CORDES.

THE $5,000-HOUSES.

WE have just received a note from Mr. Burdett, winner of one of the prizes in the $5,000-house competition, and author of the design marked "*Normandie*," which says: "I do not know whether or not it will be of interest to any one to know that the house is now being built, in a very thorough manner, at a cost of $5,500. This sum covers some increase in size over the design submitted, also fireplaces, hardwood floors, concreted cellar, plumbing and grading."

NOTES AND CLIPPINGS

THE ERUPTION OF ETNA. — The following extract is from a private letter from the engineer in charge of the Palermo-Corleone Railway, published in the London *Times:*

CATANIA, May 24.

You have probably heard of the eruption of Etna which is going on. I left Palermo Saturday and came here to see it. We left here about three o'clock (six of us, English) Saturday afternoon and drove to Nicolosi, which we reached about five o'clock, and got mules and went up to the scene. There were crowds of people going there, but we took a different road and went up much higher than the general crowd. We had a guide with us, and after about three hours' climbing we got to within a couple of miles of the crater itself. It is at the side of Etna, you know, not near the top, that this eruption has broken out, and we got on to a bit of high ground overlooking the whole scene. It was still daylight when we got up there, so that we saw the whole thing by daylight. We then settled ourselves down to dinner which we had brought with us from Catania, and of course it was soon dark, and here we were comfortably "feeding" before the most glorious and indescribable sight I ever saw in my life. It is perfectly impossible to describe it, as no one can have any conception as to what it is like until they see it, and also until they see it from where we did, which was on high ground overlooking nearly the whole of it. At the top is this enormous crater throwing out flames and throwing up stones some hundreds of yards, with a continued roar like any number of battles going on, and just below is another mouth from which the lava comes, travelling at an tremendous pace. It divides into several streams and follows the valleys. Now imagine from where we were that night, with our backs to Catania, what we saw. On our right, this enormous flame going hundreds of feet into the air, making the whole sky bright red, and all down past us from our right and extending down miles to the left, streams of red-hot lava moving downwards in a mass for miles and looking like an enormous sea of red-hot coke. The width across the lava where we were was, perhaps, three or four miles, and it started about two miles above us and flowed some four miles or so below us, so you must imagine a sea of angry, red-hot lava five or six miles long, and three or four wide, and about forty or fifty deep, but all of it bright red. You can judge whether it was a sight worth seeing. I would not have missed it for worlds. The lava is not liquid, as most people suppose, but consists of many millions of large and small blocks of rocky-looking stuff rolling onwards. We saw one huge rock of old lava standing in the middle of the stream of lava, which was divided by it and ran around it; the rock was about the size of (say) Quidenham Church, and this rock suddenly split into two parts; the smaller half crumbled up, and the other half was carried bodily down with the stream slowly and steadily. We watched it until we left, and it moved about three-quarters of a mile in about three-quarters of an hour. We waited there until nearly midnight, as we could not venture down until the moon got up, and then we reluctantly left this magnificent sight, which, as I tell you, no description can give you any idea of. As we went up we had all 'gone into a little house to see it, and walk round it, and thought it was unpleasantly close to the lava. Well, as we came down this house was in flames and caught by the stream. In many places we had to take different paths, so quickly had the lava spread as it came down; and from below it is awful (quite close to it), to see this mass thirty or forty feet high coming slowly towards us. I brought a piece of red-hot lava down with me which the guide got hold of for me, as I could not get it myself; it was so fearfully hot I could not go close enough. We put wire around it and I carried it down on the end of my stick. In fact we each brought a bit down, and also some ashes or cinders, which rained down on us whenever the wind was our way. We got back to Catania at about 4:15 A. M. We were up near the crater nearly four hours. We saw other people go up to see the lower end of the lava, stay there a few minutes, and go down again; but the way to do is to go right high up, arriving by daylight, and then stay there to see it by night, and watch the changes going on: it was glorious.

The Artist Population of Paris.—Paris contains 42,646 persons who call themselves artists, including painters, sculptors, designers, engravers, wood-cutters, painters on porcelain, actors, singers, musicians, and public performers of all sorts. A little over 20,000 of this number are women.—*N. Y. Evening Post.*

Growth of the Suburbs of Paris.—The movement of the Paris population from within the walls to the suburban communes is shown by the returns of the suburban census, which complete the results for the whole of the Department of the Seine. While with a total of 2,250,000 in Paris proper, the increase was only about 16,000 in five years, the numbers in the suburbs rose from 522,609 to 607,712, an augmentation of 85,103.—*American Register.*

Have the Martialists discovered the Virtue of Tree-planting.—"If we are to accept the theory just broached by a French astronomer, M. Maurice Lespiault, on the subject of the novel and unaccountable appearances discovered by Signor Schiaparelli on the surface of the planet Mars, they read a lesson to ourselves," says the *St. James' Gazette.* "The discoverer took them for canals; but M. Lespiault refuses to believe in canals a thousand miles long and fifty broad in Mars or any other planet. The mathematical regularity of the outlines forbids us regarding them as natural phenomena, however, and his conjecture is that they are vast strips of forest created to remedy the inconveniences to which the people of the planet found themselves exposed after having denuded the surface of their globe of the provision made by nature for their defense against the fury of the elements, as we are on the high road to doing ourselves."

The Dangers of Granolithic Pavement.—About 1 o'clock A. M. recently the attention of Detective Taylor, who was doing duty on Main street, was attracted by cries of "Help! Help! Help!" which seemed to proceed from a point at the corner of Main and Wall streets. Rushing to the spot he found that a young man and young lady, who had been standing there, engaged in conversation, for about two hours (he had previously noticed them several times), had recklessly, or thoughtlessly, or ignorantly chosen one of the fresh slabs of the new granolithic pavement which is being placed around the bank building, as a place for their confab. Now, as almost everybody knows, for almost everybody has stood and watched the process, this pavement is composed of a substance that hardens quickly, and the longer it remains the more solid it becomes. Well, these people were in a dreadful plight. They were fastened down tightly, they could n't move their feet. Mr. Taylor, comprehending the situation at once, ran to a cellar near by, procured a pick, and after a half-hour's hard work managed to release the couple, but their shoes were ruined. However, they were exceedingly grateful and promised Mr. Taylor their pictures as a reward of merit. The above is the story which Mr. Taylor relates.—*Bridgeport, Conn., Farmer.*

The Attractiveness of M. Eiffel's proposed Tower.—The iron tower which is to form the chief attraction of the Paris Exhibition of 1889 is already beginning to fill the Parisian mind with apprehension; and a *savant* explains in the *Moniteur* the curious phenomena which will be produced by this immense mass of iron rising to a height of 300 metres. He says that the enormous blocks of iron running north and south will become polarized, and that this polarization will soon invade the whole column. Then who knows whether the four lifts with their continual friction will not increase the magnetic influence a hundred fold? In this case all articles for a mile around will be attracted to the tower, and will adhere to it as a needle does to a magnet. If the troops quartered in the Ecole Militaire, hard by, be called out to drill, it will be all in vain for the commanding officer to shout "*En avant*" if they are paraded with the column behind them; they will irresistably be drawn to the rear, with the exception of the drummer, who does not carry a rifle. All the houses in Paris will suffer from a St. Vitus's dance and, gradually attracted toward the Champ de Mars, will finally find themselves stuck to the tower. As for locomotives entering Paris, it will be found impossible to stop them at the various termini; they will rush through Paris and dash themselves to pieces against the centre of attraction. These and other evils, we are told, will follow the erection of the great Eiffel tower; but then the *Moniteur* is opposed to the anniversary of the capture of the Bastile being observed, and may have exaggerated the consequences.—*St. James' Gazette.*

Buying Houses "on Easy Terms."—"If these easy-terms houses were just what they look to be," said the retired builder, "the deal would be perfectly square. But that is the costly rub. For instance, you want to buy a house for $3,000, and you pay $500 down and move in. Then you begin to pay off the balance at the rate of $20 a month. That 's easy, is n't it? Just take your pencil and figure it up. Twenty dollars a month is $240 a year. Interest at 5 per cent is one hundred and twenty-five; taxes and water-rent, sixty more, and the total is four hundred and twenty." "Thirty-six dollars a month?" "Pretty nearly. But that is n't all. There's the repairs, my boy. You 're lucky if you don't have to put on a new roof the second year; your pavement is sure to need repaving; the plumber will call on you about six times a year and, in short, you will soon find another hundred a year tacked on to your easy terms. Now what do you naturally do?" "I naturally kick," I replied with considerable energy. "T won't do you any good," said my friend. "You've signed an iron-clad contract. You must pay or go." "Exactly," responded the ex-builder, with a genial grin, "that 's just what 50 per cent of the victims do. They do what they should have done first—figure it up and it scares them. They look forward to twelve years of this sort of thing and they see that they have the hot end of the poker; then they drop it." "Do you mean to say," I inquired, severely, "that none of the money is returned?" "Well," said my friend, meditatively, "there was a rumor once that a contractor did return about a third of the purchase money to a certain man, but as I never could find either the man or the contractor, I guess it was a ghost story."—*Philadelphia Call.*

Protecting the Ancient Buildings of Paris.—The Société des Amis des Monuments Parisiens, a body similar to the Society for Protecting Ancient Buildings, has taken up arms in defence of the historical and architectural relics which are menaced by the railroad, which is already called Le Métropolitan.—*Exchange.*

Concrete Floors.—These are sometimes formed on a centring of pieces of fir of proper scantlings resting on a trestle or on the lower flanges of the girders. Across these transverse pieces are laid, and boarded with boards of, say, 1 inch thick and close jointed. The concrete is laid in bays; each is finished in one operation, so as to form a slab. The ingredients may be as follows: 1 part cement to 4 parts of breeze or other porous substance, iron slag, hard bricks, well-burnt clay, which have to pass through a ¾-inch mesh. If fine stuff is required, clean smith's ashes may be used, as being better than sand, the fine stuff not exceeding one-third of the whole. Portland cement if fine ground, capable of passing through a sieve of 2,500 meshes per square inch should be used, and the following test is given: When made up wet and filled into a glass bottle, and struck level with the top, it must not in setting crack the bottle or rise out of it, or become loose by shrinking. When filled into moulds, and after being seven days in water, it must have an ultimate strength under tensile stress, slowly applied, of 250 pounds per square inch of section. The mixing is to be performed by turning the ingredients over twice dry, then shovelled to a third heap, at the same time adding from the rose of a hose water enough to make ingredients cling together. The broken material and breeze should be damped before mixing. The concrete, after being laid, is slightly rammed with wooden beaters, and the surface should be kept damp by water fourteen days after laying. The soffits should be well wetted, and a setting coat of fine stuff given. These are the instructions given in a specification for concrete floors, and may be usefully followed. Slabs of concrete 6 inches thick have been found to break from 1 cwt. to 2½ cwt. per foot super., the size of the slab being about 14 feet by 13 feet in the former case and 14 feet by 7 feet in the last. Experiments have not been sufficiently numerous or conducted with enough exactness to insure any reliable rule, the slabs crack suddenly, and there is little warning after the ultimate resistance has been reached.—*Building News.*

TRADE SURVEYS

All the industrial features are favorable. Although harping somewhat upon the same thing, it may be mentioned that the enormous demand for railway material and appliances of all kinds continues to be the most encouraging and significant factor in the entire situation. The fact has become more apparent that if railroad buyers carry out their programmes they will be obliged to buy foreign material quite liberally; in fact, brokers for foreign makers announce that they are about closing contracts for several large lots, for delivery in the Southwest, not on account of prices, but on account of the inability of American rail-makers to deliver rails at those points as soon as wanted. The probable volume of business of this kind is only guess-work. The production of the rail-mills this year will not be under 1,500,000 tons, and rail-sellers say they expect the bulk of the rail business will be done during the next two months. This is only one favorable feature. The other is the increase in inquiry during the past week for locomotives and rolling-stock of all kinds from palace-cars down to coal-cars. A great deal of stock is worn out and is being replaced. The car-builders throughout New York, Pennsylvania and the West have booked a large amount of business within six days, and are now negotiating for large contracts. There is also a good deal of activity at the ship-yards and the lake boat-yards. In fact there seems to be a general movement to increase the water-carrying capacity for heavy freight. A large amount of coastwise tonnage has been lost within a year, and owners have withheld the placing of contracts for its renewal, until more than doubly assured that their capacity would be profitably employed when finished. The iron trade is on the eve of a general moderate improvement. The coal trade has been strengthened by the action of the coal-trade managers of New York, in advancing prices. The demand will be heavy throughout the fall and early winter for both hard and soft coal. Consumers everywhere have been waiting to see how things will go, and, now that they see, they are going in to market and negotiating for supplies. The lumber trade may be similarly disposed of. The jobbing trade all along the Atlantic coast have been purchasing only to fill orders received. Several large dealers have placed contracts during the past week for lumber supplies to be delivered along during the fall. Prices are firm throughout the trade. The number of permits taken out in the larger cities throughout the country show no general falling off, but here and there fewer permits have been taken out. The general influences at work are of a favorable character. Architects are more busily engaged, and builders, especially in the Western States, are pushing forward contract work with all possible energy. In some near-by Eastern towns there is an appearance of dulness. Most of the work given out in the early spring is completed. Material of all kinds is firm. Bricks are still scarce at two or three points. Laths and shingles are coming forward liberally. The planing-mill interests all over the country are crowded with business, and the saw-mills are as full of work as they have been at any time for two months. A good many saw-mills are being erected in the Virginias and in two or three other Southern States. The crop report continues favorable. The possible supply of wheat shows a slight increase. Bearish influences creep out once in a while, but are short-lived. The cereal supply for export will be fully up to former seasons, and by some authorities is placed at as much as 50,000,000 bushels more. The aggregate of sales each week during the summer has shown an improvement over corresponding weeks last year, and this favorable condition of trade is likely to continue without any upward tendency in prices, and also without any undue effort to increase production in consequence. Manufacturing interests are guarding this point carefully. There is a steady increase in capacity in all branches of trade, but it is not a wild one. The mining industry throughout the country is in a highly satisfactory condition, a fact corroborated by the statements of leading manufacturers of mining machinery both East and West. Since July 1 several good-sized contracts for machinery have been given out, and several large machinery manufacturers write that their inquiries point to an unusual heavy pressure for machinery of all kinds from the finest to the heaviest.